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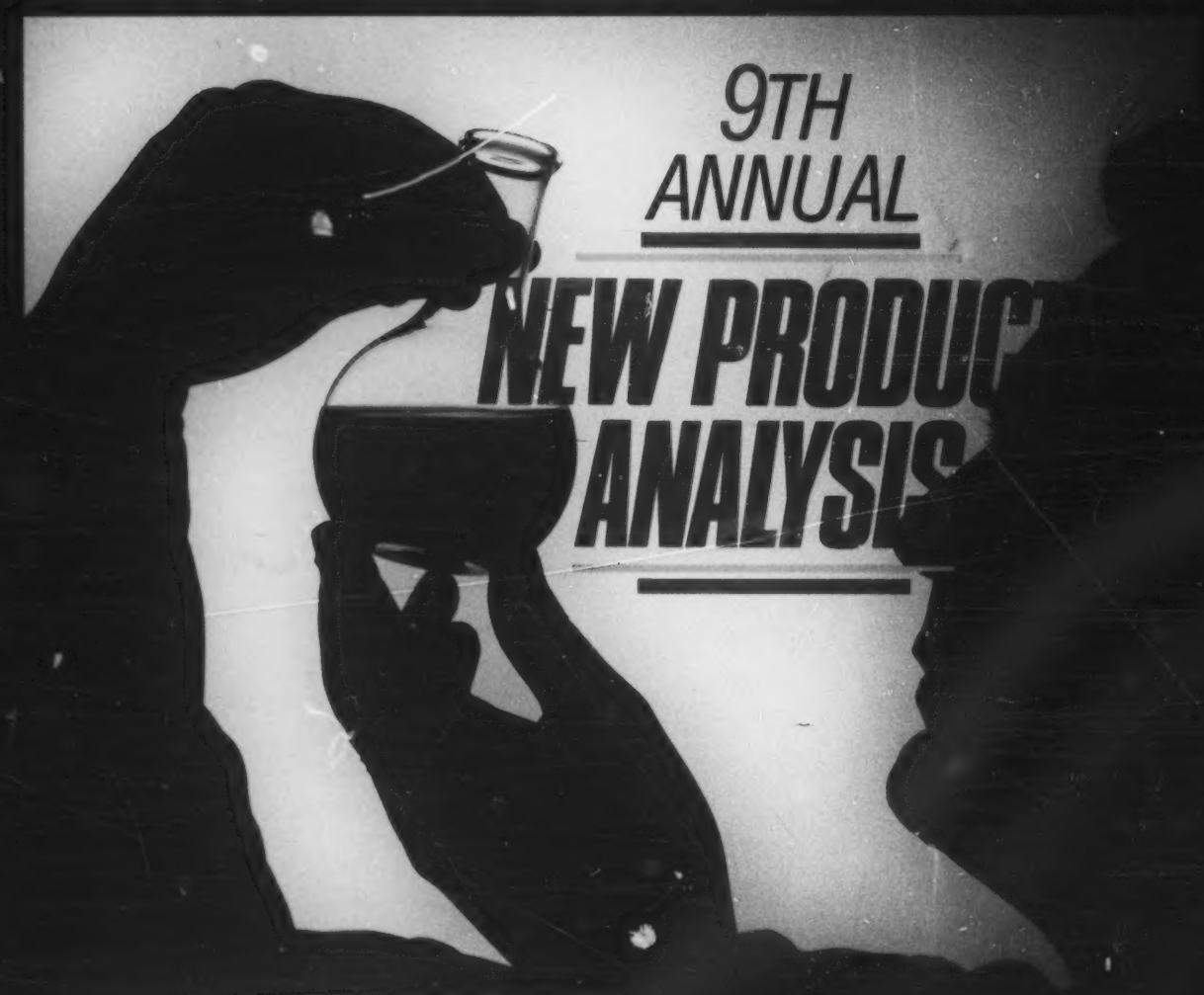

9TH ANNUAL NEW PRODUCT ANALYSIS

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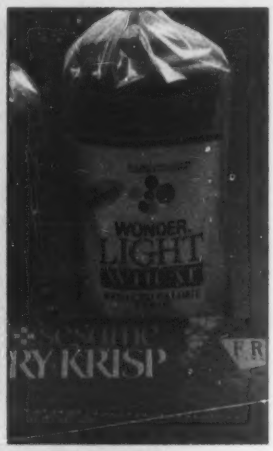
FOOD ENGINEERING



COVER STORY

Food Engineering's ninth annual "New Product Analysis" shows that new food introductions are slowing down. And many of the introductions are merely line extensions or new sizes.

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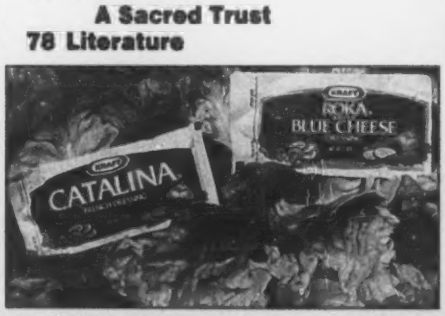

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VALVES AND VALVE CONTROLS

Valves in a food or beverage plant are like paperclips in the office—they're everywhere! But specifying specific valves for individual uses involves a lot more than choosing the right paperclip.

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NEW PRODUCT ANALYSIS

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1988 food and beverage introductions

Foods	Total Intros.	New Brand	Line ext. w/in brand	Other (i.e new package)	Total SKUs
Baby food	19	5	-	14	69
Fruits	43	9	1	33	70
Vegetables	98	23	5	70	227
Pasta products & combos	60	12	1	47	154
Rice & rice combos	35	5	-	30	84
Prepared salads	17	2	2	13	47
Bread & bread products	128	41	4	83	363
Pastry & baked products	95	23	2	70	264
Cake mixes & cake frosting mixes	18	5	-	13	44
All other baking mixes	31	5	3	24	57
Desserts	24	6	-	18	65
Chocolate candies	90	28	2	60	292
Non-chocolate candies	79	20	1	58	211
Chewing gum	19	2	1	16	34
Cookies	130	38	2	90	289
Crackers	51	9	-	42	86
Chips	95	23	-	72	159
Popcorn	40	9	2	29	90
Nuts & seeds	33	11	3	19	103
Snack bars	21	3	2	16	37
Other snacks	77	17	2	58	233
Meat	83	20	-	63	164
Fish	32	8	-	24	80
Poultry	59	10	-	49	102
Vegetable protein products	21	9	-	12	65
Meals & entrees	140	43	3	94	330
Entree mixes	18	6	-	12	37
Meat meals & entrees	82	23	1	58	163
Fish meals & entrees	25	5	-	20	65
Poultry meals & entrees	60	4	1	55	94
Vegetable meals & entrees	16	3	-	13	39
Cereals	90	9	2	79	142
Ice cream & ice cream cones	135	39	7	89	432
Cheese	73	19	2	52	191
Margarine, butter, etc	16	4	-	12	22
Other non-beverage dairy case products	14	9	-	5	26
Dairy substitutes	11	4	-	7	23
Yogurt & yogurt imitations	37	13	-	24	133
Sweet toppings	49	16	3	30	121
Jams, jellies, marmalades, sweet butters	42	15	1	26	195
Nut butters	18	3	1	14	49
Savoury spreads	18	6	-	12	104
Soup	45	11	2	32	111
Oil & shortening	23	6	1	16	51
Pickles, relishes, olives, chutney, etc.	45	7	1	37	132
Catsup	9	2	-	7	10
Mustard	36	7	1	28	67
Spaghetti sauce & other pasta sauces	29	6	-	23	61
Other sauces, gravies & condiments	131	38	6	87	306
Mayonnaise & imitation mayonnaise	4	-	-	4	13
Salad dressings	59	11	4	44	129
Salad toppings & dips	24	4	1	19	43
Spices, extracts & seasonings	127	47	2	78	407
Staples	28	3	2	23	49
Special diet foods	26	6	-	20	68
Miscellaneous foods	1	1	-	-	1
Beverages					
Wine & wine coolers	63	15	-	48	149
Beer & ale	63	14	1	48	94
Liqueurs	14	4	-	10	38
Other alcohol	21	3	1	17	33
Alcohol beverage substitues, low alcohol	4	2	-	2	5
Cocktail mixes	5	1	-	4	7
Mineral water & bottled water	39	26	-	13	120
Miscellaneous soft drinks	89	19	1	69	252
Isotonic, energy producing beverages	15	3	-	12	39
Health drinks	12	3	1	8	35
Fruit & fruit flavored	120	28	3	89	374
Vegetable & vegetable flavored	8	-	1	7	12
Baby beverages	6	-	-	6	15
Milk & non-dairy milk	31	15	1	15	68
Milk additives	10	3	1	6	22
Tea	53	15	-	38	169
Coffee	32	9	2	21	87
Beverage mixes & bases	26	11	1	14	67
Total	3440	884	87	2470	8589

Source: Productscan™/Marketing Intelligence Service

Food manufacturers are beginning to heed their own warnings that too many new foods are being introduced. New food and beverage introductions for 1988 totaled 3,440, or 141 less than in 1987 when a record high of 3,581 new foods and beverages entered the market.

The rising costs of new food introductions not only played a role in slowing down new entries, it also contributed to a greater percent of new food and beverages coming from major manufacturers. According to Marketing Intelligence Service's Productscan™, the top 20 companies in food and beverage introductions accounted for 20.9 percent of the total introductions in 1988, as compared to 17.8 percent in 1987.

"Introductions were still rising sharply through the first half of 1988, but we think marketers have become more cautious due to the impact of excessive numbers of introductions and continued high rates of failure, concerns about economic slowdown, and the high cost of slotting fees charges by distributors," explained Richard Lawrence, president of Marketing Intelligence Service, a marketing research firm located in Naples, NY. "Successful new products continue to be vital to corporate growth in mature markets but marketers are giving ideas harsher scrutiny, doing more upfront testing, and aiming to put fewer, but better new products into the marketplace."

This climate of caution is also seen in the relatively small proportion of new brands being launched. Marketing Intelligence reports that 71 percent of introductions were not really new but only new sizes, flavors, varieties, and kinds of existing products.

Campbell Soup Company introduced 47 new products in 1988 as compared to 48 in 1987. Speaking at the annual Frozen Food Convention in Chicago on October 10, 1988, Campbell's President and CEO, R. Gordon McGovern said, "What is emerging in today's frozen food marketplace is the limited number of eating patterns most people lock into. Their minds and palates do not want to consider 200 esoteric choices each night. They don't want that kind of decision and risk-taking...We are settling out of the blizzard of new product explorations of the past 5 or 10 years. The retailers didn't opt for much more space. The consumers didn't opt for much range. Economics dictates the solution."

McGovern also said that marketing strategies should revolve around a limited set of core brand items which will be heavily supported both in the trade and to the consumer. Heavy support of new products is becom-

ing more important as space for new products in supermarkets becomes more scarce.

A company which has had much experience with new products is General Foods USA (GF USA), which is one of the units of the newly formed Kraft General Foods, the food division of Philip Morris Companies, Inc. (In 1988, Philip Morris introduced the most new food products and Kraft Inc. was fourth. Philip Morris purchased Kraft in October of 1988.)

"Different food manufacturers have different success rates for new products," David J. Driscoll, V.P. of strategic planning, General Foods USA, told *Food Engineering*. "We have a very good reputation, and since the trade knows we'll provide strong support for new products they are more receptive to us."

Business units within General Foods USA are run by general managers who are responsible for meeting consumers' needs in their areas of expertise. If there is current dissatisfaction within that area, a new product may be initiated. Investment for new products shows up in a business unit's strategic five-year plan and annual operating budget, which is approved by the CEO of GF USA. Several of the considerations in new product planning are: whether there will be enough growth from new product activity to meet total growth plans with an affordable investment; what categories have the greatest growth potential; and seeking a balanced development portfolio or near-end and long-term projects.

Driscoll also mentioned the importance of strengthening core businesses. "It is more likely a decision will be made between two potential new products rather than between new product support and core business support," he explained.

It's no surprise that food companies have become more market driven. But at the same time demographic and social changes have made consumer markets in the U.S. more segmented and more difficult to predict.

"An essential element for more efficient marketing is a deeper understanding of the consumers," stated an article in *Advertising Age*, November 9, 1988, p.130. "Such understanding is rarely achieved but is, in fact, an ongoing process as consumer trends unfold and the American family changes in size and character."

The desire for convenience remains the major driving force in new food and beverage introductions. But many new foods and beverages are also reflecting Americans' increased concern for their health. Quality, though, is also increasing in importance. If consumers pay for quality, they expect it. Premium frozen entrees are losing momentum, yet sales of more expensive refrigerated prepared foods are growing.

In the frozen food area, current growth areas are microwaveable hamburgers and other sandwiches, and foods that offer nutritional benefits such as reduced-calorie entrees. Other niche areas showing promise are foods specifically marketed for children, and gourmet pet foods. And after all is said and done, Americans do like to reward themselves, so categories such as premium desserts, snacks, cookies, crackers have also been active.

Frozen, microwaveable

Although consumers continue to crave easy-to-prepare foods, meeting this demand

1988 food & beverage introductions
(top 20 companies)

		1988	1987 (rank)
1.	Philip Morris Companies, Inc.	67	75 (1)
2.	General Mills, Inc.	53	34 (9)
3.	R.J.R. Nabisco, Inc.	50	56 (2)
4.	Kraft Inc.[1]	49	55 (3)
5.	Campbell Soup Company	47	48 (4)
6.	Nestle Holdings, Inc.	44	40 (6)
	H.J. Heinz Company	44	36 (8)
8.	Unilever United States Inc.	38	41 (5)
9.	Quaker Oats Company	36	21 (12)
10.	ConAgra, Inc.	35	21 (12)
11.	Beatrice Company	32	37 (7)
12.	Pepsico, Inc.	31	*
13.	Whitman Corp. (I.C. Industries)	29	*
	The Pillsbury Company	29	*
15.	Ralston Purina Company	27	*
16.	Borden, Inc.	26	17 (17)
	Sara Lee Corporation	26	24 (11)
18.	Geo. A. Hormel & Co.	20	18 (16)
19.	The Coca-Cola Company	19	*
20.	Mars, Inc.	18	21 (12)
	Total - top 20 companies	720	638
	% of food & beverage intros.	20.9	17.8

* Not ranked in top 20

[1]In October 1988, Philip Morris Companies, Inc. purchased Kraft Inc. And on March 1, 1989, Kraft General Foods Group was formed.

Source: Productscan™/Marketing Intelligence Service

alone is not enough to sustain increased sales of a food item. During the early and mid-'80s, sales of gourmet frozen entrees rose dramatically, but the growth is leveling off. Sales of frozen entrees for 1988 were $3.149 billion or a 5.2 percent rise over 1987 sales, reports SAMI/Burke, Inc., a New York City-based market research firm. This is in comparison to double digit growth earlier in the decade.

An article in the April 25, 1988 issue of *Business Week* stated, "Now the once-torrid industry is settling in for a chilly time of little or no growth and fierce fights for market share." Some of the reasons given were that premium foods are too pricey for routine family feeding, and while young high-income singles and couples over 50 were willing to try these products, repeat purchases were not occurring due to dissatisfaction with the price/value relationship.

The frozen food industry is aware of the problems they face. Campbell Soup's president, R. Gordon McGovern also stated at the National Frozen Food Convention, "I am convinced that the American public is greatly disappointed in its frozen food choices and it is only a matter of months or hours before fresh, or refrigerated, or aseptic, or nitrogen flushed products drive frozen to the wall."

This price/value relationship is responsible for consumers depending more heavily on foods prepared in restaurants, supermarket delis or take-out food stores, as well as scratch cooking, according to a study conducted by *Better Homes and Gardens* magazine. This study also reported that 50.5 percent of those responding purchased frozen dinners less often than two years previously, 14.8 percent reported purchasing frozen dinners more often and 30.9 the same amount.

Competing with take-out foods and refrigerated and shelf-stable products, successful new frozen foods need to address the desire for convenience in addition to offering good quality for the price paid.

Still, while sales of frozen entrees (especially premium ones) are leveling off, it remains a huge category and one with potential in niche areas. Much has been said about the settling down of the baby boomers and about the U.S. becoming a more family oriented society as opposed to the "me" mentality prevalent earlier this decade. This has led to an increase in popularity of "home-style" products such as hamburgers, pizza and chili. But the return of women to the workplace shows no signs of reversing. This creates the need for "speedy home cooking," opening the way for frozen foods to recapture some of the sales lost to take-out establishments. The common denominators of frozen foods competing with fast food outlets are single servings or portion control, hand-to-mouth eating, and microwave oven preparation, according to Marketing Intelligence. New product introductions in this area have grown from only a few items in 1984 to over 40 in 1988.

The use of the microwave to prepared eat-on-the-run foods is apparent when one examines the types and frequency of foods purchased for microwave preparation. Business Trend Analysts (BTA), Commack, NY, conducted a survey of households which asked what types of foods are purchased for microwave preparation. Sixty-five percent purchase snacks such as popcorn, followed by 60.3 percent who purchase frozen vegetable or side dishes and 40.8 percent who purchase frozen pizza.

A study conducted by Campbell Soup Company and the Food Marketing Institute last year reported that take-out and home delivery now accounts for 15 percent of all food consumed. Many of the new frozen foods introduced in 1988 attempted to do just that. And one of the categories where food processors are battling take-out establishments is pizza. During the fall of 1988, Stouffer Foods Corp. announced that it was introducing a new line of frozen traditional-style pizzas specifically to capitalize on the growing $22 billion pizza market.

"Pizza sales are growing faster than hamburgers, chicken, fish, Mexican and other fast-food items," noted Gerald DeCroce, Stouffer's vice president of marketing. "Most of the pizza sales are now taking place outside the grocery store, and we think our traditional-style pizza product will bring the business back into the grocery stores. Our objective in creating this product line was to provide a traditional pizza that is good enough to attract pizzeria customers."

Stouffer has offered a French Bread Pizza line nationally since 1979. The new traditional pizza from Stouffer comes in cheese, deluxe, pepperoni, sausage, sausage and pepperoni and extra cheese varieties.

"We've found through research interviews that there is a level of dissatisfaction with home-delivered pizzas," said Bill Biggar, marketing manager for Stouffer's Pizza. "Consumers tell us that pizza often arrives cold, and there is a general lack of consistency in quality. This information reinforces our belief that there is a strong market for a product like *Stouffer's Traditional Pizza*."

Currently, home-delivered/pizzeria pizza accounts for more than 90 percent of the category sales.

Another introduction in this category comes from Marshall, MN-based Tony's Pizza. Under its *Red Baron* label, the company added several varieties to its line of *Red Baron Deep Dish Singles Pizzas*—supreme and pepperoni. The supreme pizzas come with sausage, pepperoni, green and red peppers, onions and 100 percent real cheese. They come in a 12-ounce box with a special tray which is to be used in the microwave only.

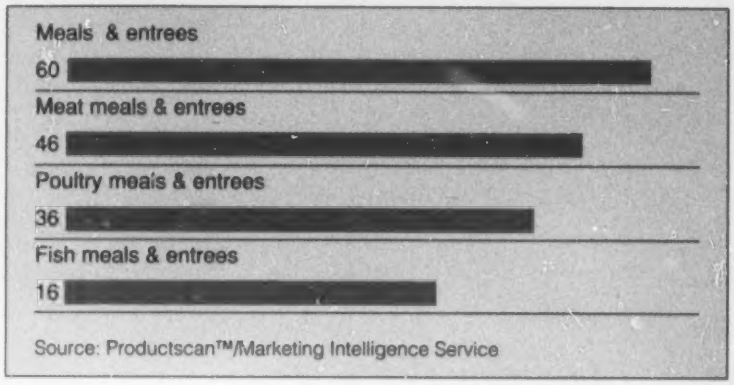
The sandwich is another area where food processors are increasing their efforts to compete with fast food outlets. Dallas, TX-based Jimmy Dean Corp. introduced microwaveable *MiniBurgers* in regular and cheese varieties during the fall of 1988. Currently in 12 percent of the country, expanded distribution is planned.

Other new frozen, microwaveable sandwiches to appear on retail shelves during 1988 include *Chefwich Sandwiches* from Tetley, Inc., Shelton CT and *Bunch o' Crunch Microwave Fish Sandwich* from Frionor U.S.A., New Bedford, MA. Austin, MN-based Geo. A. Hormel & Co. expanded its *New Traditions* line to include chicken and fish dinner sandwiches, and the *ZAP Microwave Entree* line from Baldwin, MO-based Banquet Frozen Foods, a division of ConAgra, includes fish sandwiches and hamburgers.

Quaker Oats Company, Chicago, IL, introduced *Old Town OvenStuffs Frozen Microwaveable Sandwiches* into test market during 1988. The six varieties include two croissant-dough turnovers, two French rolls stuffed with Italian fillings and two pita-bread items. Also in this category are *Lean Pockets* from IEI of Chatsworth, CA. Chicken Oriental, chicken parmesan, and beef and broccoli are among the varieties offered.

Pizza and sandwiches are not the only areas where frozen food manufacturers are waging a battle against fast food outlets. Other heat-and-run foods being introduced to entice consumers to purchase more frozen foods fall in the poultry and breakfast categories. Frozen breakfast sales now top $500 million, according to some estimates.

1988 frozen, microwaveable introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

The leader in this category, Campbell Soup Co. announced the expansion of its *Swanson Great Starts* frozen breakfasts with a line of microwaveable Belgian waffles and a line of microwaveable budget breakfast entrees during the spring of 1988. The waffles debuted in supermarkets in the western half of the U.S. and in Chicago, while the budget breakfasts were introduced in the eastern and southern portions of the U.S.

Developed specifically to be prepared in a microwave oven, the waffles can also be prepared in a conventional or toaster oven. Two varieties are offered—*Belgian Waffle & Sausages* and *Belgian Waffle & Strawberries in Sauce.*

The Swanson Great Starts Budget Breakfast line also consists of two varieties—*Silver Dollar Pancakes and Sausage* and *Scrambled Eggs and Home Fried Potatoes.* Both varieties can be prepared in a conventional or microwave oven, and have a suggested retail price of 99 cents per entree.

Swift-Eckrich, Inc., Oak Brook, IL, also is tempting Americans to stay home for breakfast with the 1988 introduction of *Swift Premium Brown 'N Serve Breakfast Sandwiches.* This line consists of a croissant with ham and cheese; a biscuit with sausage, egg and cheese; a croissant with bacon and egg; English muffin with sausage and egg; and individual sausage and biscuits. In announcing its breakfast sandwich line, Swift-Eckrich pointed out that this segment of the market grew 54 percent during the year pre-

Dial Foods' Doubletree Foods brand shelf-stable Lunch Bucket entrees and soups went from 16 percent distribution in the U.S. at the beginning of 1988 to 65 percent by the end of the year.

ceding the introduction.

Geo. A. Hormel added *Steak Breakfast Sandwich* to its New Traditions line of frozen entrees during 1988. This product can be microwaved in less than five minutes or heated in a conventional oven.

In the area of poultry heat-and-run items, Pilgrim's Pride Corp., Pittsburg, TX, announced the introductions of a line of chicken-based products specifically developed for use in microwave ovens. The microwaveable products are chicken nuggets, chicken patties, hickory roasted chicken and hot'n spicy chicken wings. They are available in 75 percent of the country.

Pilgrim's Pride chicken nuggets and patties are coated with a crunchy breading and feature a browning element inside each carton. The company reports good acceptance of these products which have been on the market since April 1988.

J.R. Simplot Co., Boise, ID, introduced *MicroMagic Microwave Chicken Sandwich* and ConAgra Frozen Foods Co., Baldwin, MO, introduced *Banquet Southern Fried Chicken* during 1988 to compete with chicken fast food outlets.

A final growth area within the frozen, microwaveable category are those products with a "healthy" appeal. While the majority of these products are low-calorie entrees, Orange, CA-based All American Gourmet Company introduced *Eating Right* during 1988. This line was developed to help consumers follow the recommended U.S. Dietary Guidelines for sodium, fat and cholesterol. Eating Right was put into test market in August 1988, and the test market is currently being evaluated.

Frozen dinners and entrees are improving nutritionally according to Tufts University. An evaluation of 451 frozen dinners and entrees produced 44 products that were highly recommended and 55 only slightly short of meeting the highly recommended requirements. This compares to only 34 products being highly recommended in a similar study conducted two year earlier. A maximum of 300 calories, no more than 30 percent of calories from fat, 1,000 milligrams or less of sodium, one-third the U.S. recommended daily allowance of protein and a minimum net weight of nine ounces were some of the criteria necessary to achieve highly recommended status.

Business Trend Analysts (BTA), reported that low-calorie frozen dinners and entrees are among the fastest growing products in the industry, with sales advancing an average of 24 percent annually over the last five years. BTA predicts that this growth will continue.

Among the new low-calorie frozen entrees were Weight Watchers' *Fancy Side Dishes* from Foodways National, Inc., Boise, ID. They were introduced into Detroit, Indianapolis, Evansville, Quad Cities, St. Louis, Wichita, Grand Rapids, Fort Wayne, Chicago, Champaign, Kansas City, Springfield, Louisville/Lexington, Dayton/Cincinnati, Columbus, Miami, Orlando, Jacksonville and Tampa.

By providing foods that answer consumers' needs, manufacturers of microwaveable frozen dinners and entrees can expect growth. BTA predicts in its report, *The Markets for Microwaveable Foods*, that this category will experience an annual growth rate of 8.3 percent through 1997, reaching $7.3 billion.

Shelf-stable

Increased microwave oven ownership has been largely responsible for the existence and growth of the shelf-stable meal category. Combining the advantages of shelf-stable retort processing with non-metallic microwaveable packaging, this new breed of products is gaining in popularity due to consumer demand for better quality in convenience products.

According to the report, *Shelf-Stable and Refrigerated Microwaveable Meals*, published in October 1988 by Find/SVP, a New York City-based marketing research firm, shelf-stable microwaveable foods totaled approximately $90 million in retail sales in 1988. The report describes three product segments for microwaveable shelf-stable prepared foods:

- **Tub** products are single-serve prepared entree items available retort-processed in

microwaveable plastic bowls or tubs.

• **Tray** products are single-serve entree items, similar in appearance and content to frozen entree products, packaged in microwaveable plastic – square or oval, tray-shaped containers.

• **Pouch** products are single-serve prepared entrees available in retort-processed pouches. They need not be microwaveable.

Find/SVP predicted that shelf-stable tub products could capture 50 percent of the prepared canned foods market within six years to reach sales of $3.6 million in 1994. Shelf-stable tray products could capture 10 percent of the prepared frozen foods market within a slightly longer period of time – perhaps eight years.

The report also points out that the tub products are a success because these products are positioned and perceived by the consumer as logical extensions of traditional canned prepared foods, while microwaveable tray products are opening up an entirely new category which offers a major marketing challenge.

During 1988, Hormel added three new items to its shelf-stable *Top Shelf* entree line – *Oriental Pepper Steak, Beef Stroganoff with Rice,* and *Beef Sukiyaki.* This line was the first tray-type, shelf-stable microwaveable product launched in the U.S. entering test market in January 1987.

Top Shelf was available in 55 percent of the country by the end of 1988. The company plans on completing national distribution during 1989 and reports that repeat sales of Top Shelf entrees are meeting the company's goals.

Capitalizing on Americans' familiarity with Top Shelf, Magic Pantry Foods, Inc., of Hamilton, Ontario, Canada, introduced a line of eight shelf-stable meals into a number of U.S. markets during 1988. Initial test market cities were Indianapolis, Cincinnati, Denver, Phoenix, Louisville, and Lexington. Oklahoma City, San Antonio, Salt Lake City, and Boise were added in early 1989. The company reports that sales of these products have been ahead of estimates.

The Magic Pantry meals are being marketed as "light ethnic entrees" under the *International Lites* brand name.

In the tub area of shelf-stable meal, Dial Foods, Phoenix, AZ, announced the establishment of the *Doubletree Foods* brand name for its *Lunch Bucket* line during 1988. Lunch Buckets have a two year or more shelf life at room temperature and can be heated in a microwave oven in 75 to 90 seconds. The line consists of nine entrees and six soups. Aimed at children for school lunches, adults for lunch at work, and seniors traveling in RVs, these entrees and soups went from 16 percent distribution in the U.S. at the beginning of 1988 to 65 percent by the end of 1988.

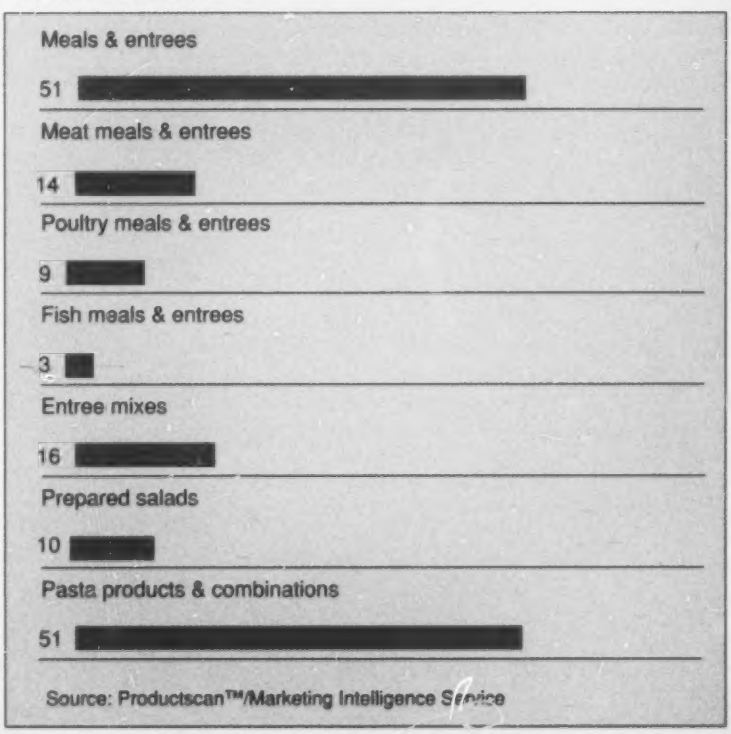
American Home Food Products, Inc., New York City, announced in 1988 the expansion of its *Chef Boyardee* line to include *Microwave Meals.* The line is packaged in single-serve, 7.5-ounce foam overwrapped, plastic, microwaveable containers that double as the serving bowl. Beef ravioli, beefaroni and spaghetti and meatballs are among the varieties offered. The national rollout began in the northeast part of the country.

A similar product to Lunch Buckets and Microwave Meals hails from Hormel. *Scalloped Potatoes and Ham, Corned Beef Hash* and *Dinty Moore Beef Stew* are among the varieties offered.

A shelf-stable soup line in microwaveable containers was entered into a Milwaukee test market during 1988 by Campbell Soup Co. Under its *Chunky Soup* brand, beef, chicken noodle, New England clam chowder, old fashioned chicken and sirloin burger varieties are offered.

A new concept in microwaveable, shelf-stable products comes from Beatrice/Hunt-

1988 shelf-stable introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Wesson, Fullerton, CA. *Hunt's Minute Gourmet* packaged dinners is a six-item line of gourmet microwave packaged dinners that allows consumers to cook with a variety of fresh meats in the microwave oven.

"Minute Gourmet revolutionizes home cooking by optimizing microwave cooking technology without sacrificing flavor or quality," says Jim Jackson, director of marketing for new products at Beatrice/Hunt-Wesson. "The Minute Gourmet system is an advancement in microwave cooking and is so unique that there is a patent pending on the cooking system. One pound of fresh meat is placed in the mylar-lined, microwave cooking bag where it is seasoned and cooked in a special gourmet sauce in minutes."

Minute Gourmet has been available in the Southwest, Southeast and Midwest since September 1988. East and West Coasts introduction took place in January 1989. Chicken cacciatore, sweet & sour chicken, barbecued chicken, Oriental beef, Italian meatballs with sauce, and Cajun pork are the varieties offered. Each has a suggested retail price of $2.29.

Refrigerated meals

Refrigerated, prepared foods is a small category with a big potential. Satisfying consumers' desire for fresh, high-quality, convenient food, refrigerated microwaveable foods could climb to between $1.2 and $1.7 billion within ten years. This is the prediction of Find/SVP in its report, *Shelf-Stable and Refrigerated Microwaveable Meals*. The report stated that the category would reach between $5 and $15 million in 1988.

Prepared refrigerated foods are competing in a crowded arena, though. They compete directly with growing deli departments in supermarkets and indirectly with all fast food. Michael P. Uetz, associate, Willard Bishop Consulting, Ltd., Barrington, IL, reported on a survey conducted by his company at the 1988 Food Marketing Institute's (FMI) annual convention. The survey, which involved focus group studies, in-store interviews of approximately 1,000 shoppers and follow-up telephone interviews, was designed to find out how consumers purchased and used refrigerated prepared foods.

"Shoppers interviewed in this study who are using refrigerated prepared foods are very excited about what these products have to offer," explained Uetz. "Nonusers appear to be holding back on a buying decision because they still aren't quite sure what it is these products have to offer."

When consumers who use refrigerated prepared foods were asked what were the most attractive product characteristics, they responded most often with homemade taste and convenience of the products. When asked what do these meals replace, 41 percent said scratch cooking, 28 percent said frozen entrees, another 28 percent said carryout foods and three percent said restaurant meals.

Controlled atmosphere packaging is allowing several manufacturers to compete with meals and entrees prepared in in-store delis.

A new $12 million plant began production of *FreshNes Fresh made meals* – a line of refrigerated main course salads and entrees designed to be heated in the microwave oven in less than five minutes. This modified controlled atmosphere line is being produced and marketed by FreshNes Foods Corporation, a new subsidiary of Nestlé Enterprises, Inc. The new company was formed in 1988 and is located in Solon, OH.

FreshNes Foods Corp. is committed to the new freshly prepared foods category. "We see this as the fastest growing category in supermarkets over the next decade and we want to be clearly identified as category leaders," said Milton Miles, president of FreshNes Foods.

The initial line of eight main course salads included items such as chicken salad Oriental, albacore tuna salad with pasta, pasta primavera and a layered Mexican-style fiesta salad. The two initial entrees were chicken breast primavera, made with chicken breast tenderloins in a creamy sauce accented with Madeira wine served over angel hair pasta,

FreshNes Fresh made meals are a modified controlled atmosphere line of refrigerated main course salads and entrees designed to be heated in the microwave oven in less than five minutes.

Circle 59 or see FEM, p. 155 →

and chicken supreme, broiled half-cut chicken breast on a bed of vegetables with a chablis sauces. The selections will be changed to keep up with current trends and seasonal changes.

Currently, FreshNes products are available in the Cleveland/Akron/Canton area with direct store delivery. Retail price ranges from about $2.39 to $4.39.

Another line of refrigerated products which initially consisted of salads, pastas and sauces, pizza kits and desserts in 1987 was later expanded to include entrees. Under the *Chillery* label, Kraft began testing the salads, pastas and sauces, pizza kits and desserts in Kansas City, MO. The entrees are being tested in Pittsfield, MA.

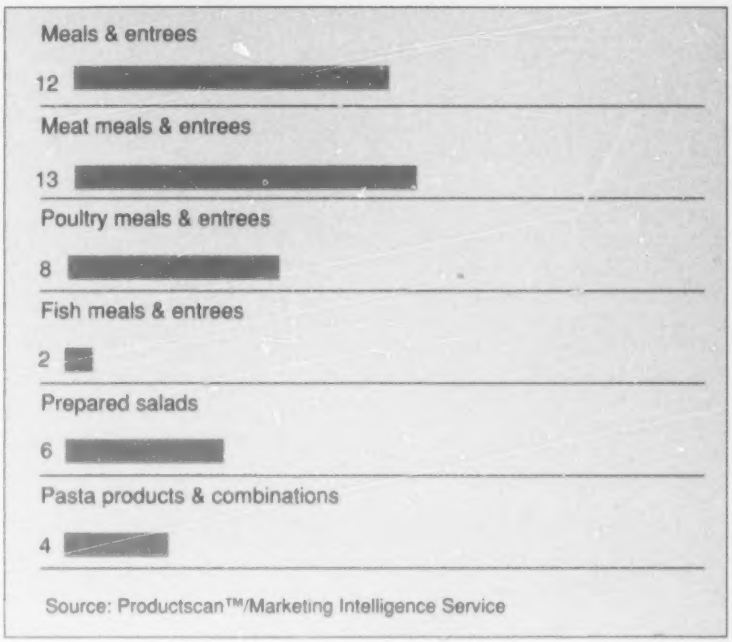
Early this year, Philip Morris Cos. announced it would discontinue *Culinova* refrigerated foods and concentrate on the Chillery line. The reason why expanded distribution of Culinova was stalled was because a refrigerated distribution system had to be developed from scratch. Kraft was using its refrigerated foodservice distribution system for Chillery.

Capitalizing on a process developed in France – sous vide or under vacuum – Culinary Brands, Inc. introduced a line of fresh, refrigerated, fully prepared food products. The sous vide processing method, developed in France during the 1970s, involves sealing fresh, raw ingredients in a pouch and pulling a vacuum. The pouch is cooked under closely controlled heat and moisture levels, then chilled to 32°F until reheating for serving.

Culinary Brands, Inc. was founded in 1986 and is located in Sausalito, CA. Additional production facilities in central California are scheduled to begin operations later this year. The company began producing refrigerated prepared foods for restaurants but in early 1988 introduced a retail line – *4 Chefs Fresh Food To Go* – into a limited number of supermarkets in the San Francisco Bay Area. Earlier this year Culinary Brands discontinued the retail line due to consumers' lack of familiarity with sous vide. The company will concentrate on foodservice markets.

The nation's largest manufacturer of prepared salads, Wheeling, IL-based Orval Kent Food Co. repositioned its popular *Salad Singles* line during 1988. A new peggable package was introduced for Salad Singles so they could hang next to lunch meats. This was done in response to research showing that these salads were most often purchased as an alternative to lunch meat. In addition, a seafood salad was added to the Salad Single line during 1988. The repositioning has resulted in increased sales, according to the company.

1988 refrigerated introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Low, light meats

According to USDA, per-capita consumption of poultry surpassed per-capita consumption of beef in the U.S. for the second consecutive year in 1988. Red-meat processors are reacting, though slowly. According to the Productscan survey, 27 meat products positioned as "low sodium," "low fat" and/or "light/lite" were introduced in 1988 as compared to only nine in '87. Most interesting were branded fresh-beef cuts combining selective breeding with tight trim to cut calories. Examples: *Larsen Beef*, supplied refrigerated in conventional plastic trays and film overwrap to Midwestern supermarket chains by Larsen Beef Co., an Ohio packer; and *Heritage Premium Quality Beef*, a lean USDA Choice grade marketed by Hughes Supermarkets in Southern California. According to Hughes, Heritage beef "has fewer calories, less cholesterol, lower sodium and less fat than whole chicken" and is the only Choice-grade beef cleared by USDA which can be advertised to contain 25 to 50 percent less fat than typical Choice beef. A 3-oz. serving of Heritage round steak, for example, contains 150 calories as compared to 192 in a 3-oz. serving of typical Choice round steak,

says Hughes. Although heavy, grain-fed cattle of Yield Grades 1 and 2, Heritage beef is based on "detailed scientific research into the genetic tendencies of certain breeds of cattle which produce leaner beef" and is trimmed to less than ¼-inch external fat, says Hughes.

In processed meats, Hormel extended its historic *Spam* brand with new *Spam Lite*, while Sara Lee's Hillshire Farms unit added *Lite Smoked Sausage* and *Lite Polska Kielbasa* with 25 percent less fat than typical varieties. General Foods' Oscar Mayer unit introduced *Oscar Mayer Breakfast Ham* labeled "93 percent less fat." Kahn's & Co. introduced five varieties of *Lite Sensations Cold Cuts*: pastrami, corned beef, smoked beef, smoked ham and smoked honey ham. Odom Sausage Co. added "lite" pork-sausage links and patties to its *Tennessee Pride* line; Rudy's Farm extended its line with *Rudy's Farm Lite Sausage*. Swift Independent added vac-packed *Swift Premium Light Pork* butts and loins. Swift-Eckrich extended its variety-pack luncheon meats with an *Eckrich Naturally Lean Smorgas Pack* including cooked ham, smoked turkey, smoked chicken breast and chopped ham.

These days, with the advent of lighter breakfast foods, consumers can eat hearty and not feel guilty about it.

New frozen meat dinners and entrees positioned as "light" or low in fat included *Eating Right* Beef Ranchero and Szechuan Beef from Kraft's All American Gourmet unit, a six-item line of Mexican-style *El Charrito Light Entrees* from Eagle Crest Foods, two *Le Menu Light Style Dinners* (Salisbury Steak and Veal Marsala) from Campbell Soup Co. and *Weight Watchers Candle Lite* London Broil from Foodways International.

'Healthy' dairy explosion

As confirmed by the FDA and FMI studies, fats are the major consumer nutrition concern, and the dairy industry responded with an explosion of 170 new non-fluid products positioned as "low fat," "low cholesterol" and/or "light/lite" in 1988 as compared to 46 in '87. Breakdown: ice cream and novelties, 63; cheese, 39; yogurts and imitation yogurts, 33; butter, margarine and blends, 14; dairy substitutes, 9; "other," 12.

The trend was typified by Kraft President & Chief Operating Officer Michael J. Miles (now president and COO at newly-merged Kraft General Foods), who told Chicago investment analysts last September that "light, low-fat products will be the drivers" for dairy-group growth at Kraft (*FE*, November '88). Borden Co. concurs with the trend, noting that while whole-milk consumption declined industry-wide, per-capita consumption of lowfat milk gained 24 percent 1981-87 and "the widening range of lowfat and nonfat dairy products—along with the more recent introduction of low-calorie, sugar-free items—is expected to lift sales further through the next decade." According to a recent beverage study by MRCA Information Services, skim and low-fat milks now represent 44 percent of all in-home milk use.

In this section we will look specifically at the cheese, butter/margarine, and dairy substitutes categories. For discussion of additional healthy-oriented dairy products, see our later sections on low-cal frozen desserts, fruit-based products, yogurts, and premium desserts.

• **Cheese:** According to a March '89 report from the Institute of Food Technologists, cheese ranks high in fat calories among high protein meat and dairy foods. Sixty-six percent of the calories in Swiss cheese, for example, come from fat; 74 percent of the calories in cheddar and 75 percent of the calories in pasteurized American are contributed by fat. Cheesemakers took aim at consumer fat concerns by introducing 39 low-fat cheese products in 1988, up from 10 in '87. Kraft led the parade with 15 varieties of *Light Naturals* natural-cheese blocks, slices and shreds in Cheddar, Colby, Swiss and Monterey Jack varieties, plus *Light n' Lively* processed American slices. Borden introduced *Light Natural* reduced-fat shreds in Mozzarella and Sharp Cheddar. *Weight Watchers* checked in with American, Dijon American, Sharp Cheddar, Swiss and Low-Sodium sliced-cheese products. Sargento introduced *Natural Light* ricotta cheese made of part-skim milk with "75 percent less fat, 75 percent less cholesterol and over 50 percent fewer calories than traditional, whole-milk ricotta" yet offering

"twice the calcium of cottage cheese." Lever Brothers rolled-out five flavors of *Shedd's Country Crock Spreadable Cheese*, positioned as low in cholesterol. Most exotic low-fat domestic introductions: *Galilee Creme de Chevre* goat cheese in plain, garlic and smoked-salmon flavors from Galaxy Cheese Co., which also introduced *Fromagg* cheese substitutes in Ricotta, Cottage and Cream cheese varieties. Low-fat imports included *Geska Genuine* Swiss Sap Sago Green Cheese from Geska Gesellschaft and *Le Roule of France* herb-and-garlic flavored Roule Light cheese from Fromageries Triballat.

• **Butter/margarine:** fourteen butter/margarine/blend spreads were introduced in '88 atop 11 in '87. Lipton introduced *Country Fair Light Butter* in lightly salted, unsalted and whipped varieties; Land O' Lakes *Country Morning Blend Light Butter*. Kraft unveiled *Touch of Butter Spread* while Nabisco extended its *Blue Bonnet* brand to include *Better Blend Vegetable Oil and Dairy Spread*, salted and unsalted. New margarine offerings in '88: *Promise Extra Light* 40% vegetable oil spread from Lever Brothers; *Fleischmann's Diet 100% Corn Oil Spread* from Standard Brands.

• **Dairy substitutes:** Excluding cheese substitutes, nine lowfat substitute dairy products were unveiled in 1988 as compared to only one in '87, according to Productscan. Two of these were sour-cream substitutes: *Fromagg Sour Cream Substitute* from Galaxy Cheese, *Slender Choice Sour Cream Substitute* from Merico, Inc. Several others were non-dairy creamers. Tofutti Brands developed *Egg Watchers*, a no-cholesterol egg replacer with 40 percent fewer calories and 75 percent less fat than real eggs, for making "any dish...that can be made with whole eggs," such as omelettes and quiche. Also from Tofutti Brands: *Better Than Cream Cheese*, a non-dairy imitation cream cheese with no cholesterol or butterfat and 20 percent fewer calories than the real thing.

• **"Other":** Twelve other lowfat dairy products not in traditional classifications were introduced in '88 versus four in '87. Among them: light sour-cream products from Land O'Lakes and Dean Foods; *Viva Cottage Classics* lowfat cottage cheese in four different flavors, from Borden. Most intriguing: *Lowered Cholesterol Grade A Eggs*, from Full Spectrum Farms, Inc.

High fiber

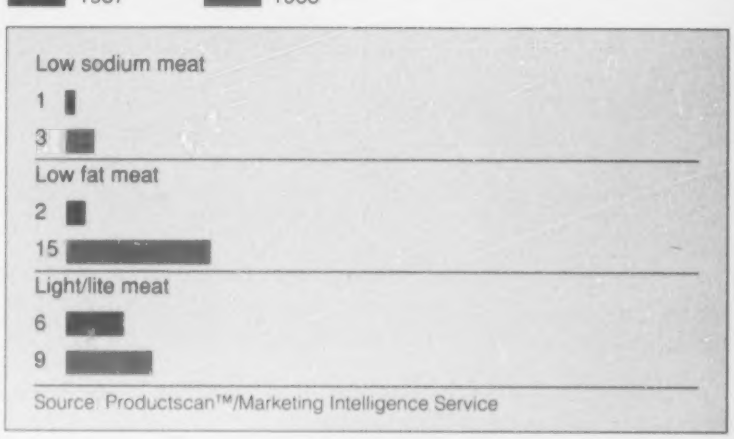
Believe it or not, fiber does not rank among the top nutritional concerns of consumers, according to Food Marketing Institute's 1988 consumer-attitudes survey. Consumers are more worried about fat, salt, cholesterol, vitamins/minerals and sugar—in that order—according to the FMI study. This is supported by FDA's 1988 Health & Diet Survey, where consumers report eating less fat and cholesterol but not significantly increasing their fiber intake since 1986.

These statistics, however, only serve to highlight even more what has to be called "the oat-bran boom," sparked by widely-publicized research showing oat bran fiber, in particular, as reducing cholesterol levels. This led last year to a wide variety of oat-bran products aimed at consumer concerns about cholesterol. Quaker Oats, for example, reported sales of its bran products zooming more than 700 percent between May '87 and May '88.

Overall, the breakfast cereal fiber fracas saw no fewer than 33 new cereals in 1988 positioned as high fiber or fiber-added, atop 24 in 1987, according to Market Intelligence Service's Productscan. Kellogg, which according to the Department of Commerce dominates the industry with 35.9 percent of sales, introduced *Fibre Up* "containing more dietary fiber than any other ready-to-eat cereal" and a line extension, *All Bran With Extra Fiber*.

Several manufacturers introduced new high-fiber cereals based on a turn-of-the-century Swiss breakfast dish called "muesli" (*FE* Sept. '86). Examples: Kellogg's *Mueslix Bran Muesli Cereal* and *Mueslix Five Grain Muesli Cereal*; Ralston Purina *Muesli Cereal* in two varieties (Rai-

1987, 1988 low sodium, low fat, light/lite meat introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

Today's health and fitness trends have pumped adrenaline into the sales of frozen yogurt.

sins, Dates & Almonds and Raisins, Peaches & Pecans); Irish Cereal Products' *Extra Fruit Muesli*; Golden Temple Bakery's *Bran Mornin' Muesli* and *Iowa Mornin' Muesli*.

Number-two cereal producer General Mills (19.8 percent of industry sales) introduced *Fiber One*; *Clusters*, a blend of bran flakes and nut clusters which GM said along with *Oatmeal Raisin Crisp* (its first oatmeal-flake cereal) and *Raisin Nut Bran*, both introduced in '87, "contributed two market share points in 1988"; and *Total Raisin Bran*, a brand extension. General Mills also flagged its popular *Cheerios* package as "An excellent source of oat bran" and unveiled its first entries into the hot-cereal category: *Total Oatmeal* in two flavors plus a variety pack, and *Oatmeal Swirlers*, featuring stir-in packets of real fruit. By the end of fiscal '88 (ended May 29), said GM, Total Oatmeal had captured a 12-percent dollar share of the instant-oatmeal segment.

Third-ranked cereal producer General Foods (12.6 percent of sales) added Cinnamon Apple Crisp to its *Post Fruit & Fibre* line and reintroduced *Post Oat Flakes*, a discontinued product from the '60s whose time has finally come. In addition to its muesli cereals, Ralston Purina (7.2 percent of cereal sales) introduced *Bran News* in two flavors and reformulated its NutraSweet-flavored *Sun Flakes* (introduced in '86) with fiber. Nabisco extended its shredded-wheat line with *Shredded Wheat Raisin Bran* and introduced *Frosted Wheat Squares*, positioned as high in fiber.

Quaker Oats, which dominates the hot-cereal segment with a 66-percent share, introduced Quaker *Extra*, a three-flavor (plus variety pack) "sub-line" of instant oatmeal fortified with 100 percent of the USRDA of 10 vitamins and iron, and added a "family pack" to its *Instant Quaker Oatmeal*. Quaker reported that greater consumer awareness of oatmeal's health benefits plus its current "Quaker Oats...It's The Right Thing To Do" campaign boosted hot-cereal sales by 23 percent and unit volume by 20 percent in fiscal '88 (ended June 30). In the ready-to-eat segment, where the firm claims an 8.3-percent market share, Quaker rolled out *Oat Squares* into national distribution, added apple-cinnamon flavor to *Oh!s* and introduced *Crunchy Bran*. Skyrocketing sales of *Quaker Oat Bran* forced the company to allocate distribution, but Chairman & CEO William D. Smithburg told shareholders at the company's annual meeting on November 9 that "we're increasing oat-bran production and we hope to end oat-bran allocation by early 1989."

Bakers were slower than their colleagues in the breakfast-cereal business to cash in on dietary-fiber, perhaps because a few were burned early in the decade when they introduced cellulose-added breads. (Cellulose is derived from wood, and negative consumer perceptions probably caused its demise.)

But the frenzy over fiber spread from the cereal shelf to the bakery rack as 16 high-fiber bakery products were introduced in 1987 and intensified as 18 more were unveiled last year, according to Productscan. And, like the cereal producers, the bakers discovered oat bran. New in '88:

- *Oatmeal Goodness Bread* in four varieties – Cinnamon Oatmeal, Oatmeal & Bran, Oatmeal & Sunflower Seeds, and Wheat Oatmeal – from Continental Baking Co. Labels proclaim "Extra oat bran added"; that "Oat Bran may help reduce cholesterol"; and even offer $5 off the price of a videotape entitled "The 8-Week Cholesterol Cure."
- *Grant's Farm* Oat Bran Bread and Oatmeal & Toasted Almonds Bread, from Campbell Taggart.
- *Brownberry* "Bakery Light" Oatmeal Bread with only "40 calories per slice," from Arnold Foods. Arnold also added a Country Oat variety to its line of *Bran'nola* "natural high fiber" breads.
- *Roman Meal* Honey Nut & Oat Bran Bread, from bakers licensed by Roman Meal Co.
- *Country Hearth* High Fiber Bread with Oatmeal, from Schwebel Baking Co.
- *Jaclyn's* Fresh Frozen Wheat-Free Muffins: Apple Oatmeal Bran, Banana Oatmeal Bran, Oatbran and Raisin Bran.
- *Pepperidge Farm* Oatmeal Bread, which makes no health claims beyond "No artificial preservatives."

• *Natural Ovens of Manitowoc* Raisin Bran Muffins, labeled "no preservatives" and stickered "Made with oat bran." Natural Ovens also markets oat bran *per se* in one-lb. packages.

Bakery applications of oat bran were not limited to finished baked products. Procter & Gamble introduced *Duncan Hines* Oat Bran Blueberry Muffin Mix, labeled "A significant source of natural fiber." Thompson Kitchens introduced *Pritikin* Rice Cakes (positioned as a snack food) with "fiber rich oat bran added," also very low in sodium and only 30 calories each.

Other new bakery products positioned by major bakers as high in fiber or with fiber added included *Wonder* Hi-Fiber Bread in soft white and soft wheat varieties from Continental Baking Co., *Five Star Fibre Bread* in three varieties from Pepperidge Farm, *Orowheat* California Breakfast Bread in two varieties from General Foods, *Lite'r 35* Bread in white and wheat from Heileman Baking Co., and *Heritage Lite* and *Sunbeam Lite* Multigrain Breads from Waldensian Bakeries. Ralston Purina extended its *Ry Krisp* cracker line with *Sesame Ry Krisp* labeled "Rich in fiber" with no cholesterol and only 25 calories per cracker. Pacific Rice Products labeled its *Crispy Cakes* as a "Good source of fiber," very low in sodium and 30 calories each. Nabisco extended its *Triscuit* crackers with a wheat and bran variety, although it is not labeled as high in fiber.

Beyond cereals and bakery products, fiber-fortified food products are few but growing.

As reported earlier in *Food Engineering* (October '88), fiber-added foods introduced during the first seven months of 1988 included: four varieties of canned beans, three snack bars, seven other snack items, four tofu desserts, four yogurt products, three frozen entrees and a dry-mix rice dish. Three fiber-added beverage mixes were introduced in 1988, one less than in '87, all in the health-foods area.

Children's food

Population estimates from the U.S. Department of Commerce show that the market for children's foods should remain relatively constant. From 1987 through the year 2010, the number of children aged five through thirteen in the U.S. is expected to remain between 31 and 34 million.

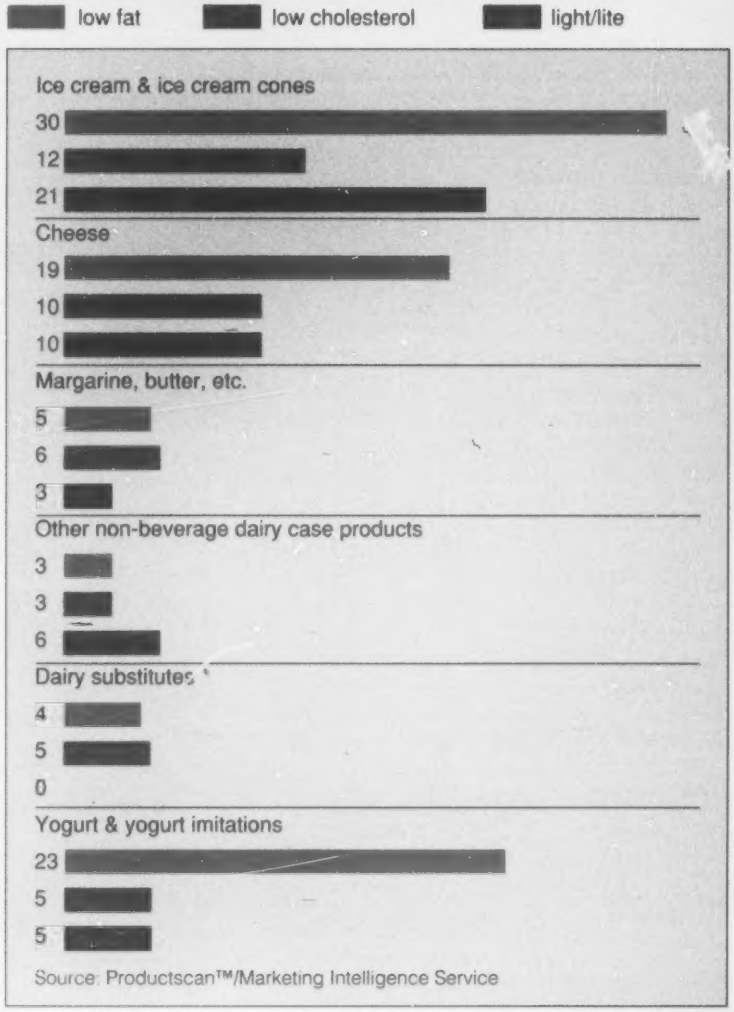
In addition to shear size, the significance of this large market includes the fact that both parents in many families with young children work outside of the home. Dual-income couples numbered approximately 26 million last year. Approximately 80 percent of these dual earners had children under the age of eighteen, according to *American Demographics.*

Several companies have discovered a niche in the market by providing easy-to-prepare, nutritious food for children.

For the first time, 1988 saw the introduction of shelf-stable meals aimed specifically at children. Geo. A. Hormel & Company introduced *Kid's Kitchen* as shelf-stable microwaveable entrees that children can make themselves. Advanced packaging allows the product to be stored unrefrigerated for up to 18 months.

Children aged five to 12 are targeted as consumers of the product while Hormel said children between the ages of five to seven

1988 'healthy' dairy introductions
no. of introductions



Source: Productscan™/Marketing Intelligence Service

may start learning to use the microwave to fix the meal themselves. The product is expected to be a boon to latchkey children who return home from school and can make themselves dinner while their parents are away at work.

Shelf stable products are a godsend to manufacturers who want to avoid the fierce competition for freezer space at supermarkets. In addition, distribution costs are reduced since there is no need for refrigerated trucks to ship the product.

Kid's Kitchen comes in seven varieties: Macaroni and Cheese; Spaghetti with Meatballs in Tomato Sauce; Chicken Chow Mein; Spaghetti Rings in Tomato Sauce; Macaroni and Chicken; Chunky Vegetables and Beef in Sauce and Beef Ravioli in Tomato Sauce. Each is formulated to meet the nutritional demands of parents and have been taste-tested by hundreds of children to meet their approval. Test marketing of Kid's Kitchen was originally scheduled for 1988 but has been rescheduled to begin in Phoenix and Detroit in late 1989 with national rollout planned for early 1990.

My Own Meal, Inc. of Deerfield, IL launched shelf-stable meals packaged in microwaveable plastic pouches (see the February issue of *Food Engineering*, page 44). However, Maryanne Jackson, founder and president, has a slightly different marketing slant than Hormel.

The frenzy over fiber has led to the bakery rack as 16 high-fiber bakery products were introduced in 1987 and intensified as 18 more were unveiled last year, according to Productscan.

As a former Beatrice executive who has two children of her own, Jackson said, "It's not important that kids fix the meal themselves but more so that mothers feel good about its nutritional value." *My Own Meal* is aimed at children aged two to eight. Jackson plans to build it as a strong regional brand within the Chicago, Northern Indiana, Ohio, Wisconsin area.

Varieties of My Own Meal include: chicken, vegetables and brown rice; chicken and vegetables; turkey meatballs, noodles and vegetables; macaroni, lentil, barley and pork in tomato sauce.

Multi-Natural Corporation of Hastings-on-the-Hudson, NY is planning to relaunch its line of frozen dinners for children aged one to five. Liz Bensley, president, said *My Food* had been test marketed in northern New Jersey but will be repackaged before being marketed on the East Coast.

Bensley said My Food is high in protein, complex carbohydrates, vitamins and minerals as well as low in saturated fat. No salt, sugar, artificial ingredients or preservatives are used, she said.

The surge in upscale faire has continued with the debut of *Mommy Made and Daddy too!* home-delivered baby food in New York City. The baby food contains no sugar, salt or preservatives and is delivered twice a week, hours after it is made. Other new entries in the baby food market:

- Beech-Nut *Babies First* and Heinz' *Beginner Foods* are new lines for babies younger than six months old.
- Organically-grown baby food from Earth's Best is moving from health food stores to supermarkets.

Pet food

If food processors ever get the feeling that business is going to the dogs, maybe going in that direction isn't such a bad idea. Dry dog food sales in 1988 were approximately $1.8 billion, according to SAMI/Burke. Sales in 1987 were approximately $1.7 billion. Sales of wet dog food jumped from $850 million in 1987 to $890 million last year. While tonnage of dry food dropped slightly, tonnage of wet dog food increased from 1.70 million tons in 1987 to 1.73 million tons in 1988. The percent of increase in both tonnage and dollars for wet dog food suggests that there is increased demand for the higher priced "premium" foods for dogs. Snacks for dogs jumped in sales from $371 million in 1987 to $402 million in 1988. New dog foods showed that humans often project some of their own wants and needs onto their pets:

- Famous Fido Doggie Deli, Inc. of Chica-

go offered cookies for dogs in cheese, liver and carob-liver varieties.

• Gaines Foods, Inc. of Tarrytown, NY, subsidiary of Quaker Oats launched *Gaines Cycle 3 Lite Dog Food* that is "expertly formulated for the special needs of overweight or less active dogs." It has 20 percent fewer calories than regular dog food.

• Mountainside Products, Inc. of Rutland, VT marketed *Mountainside Gourmet Jumbo Chocolate Chip* and *La Petzza Pizza Pet Treats.*

• H.J. Heinz's Star-Kist Foods, Inc. division, based in Long Beach, CA, has unveiled *Reward* dog food. The company said the seven varieties exceed nutritional recommendations from the National Research Council.

Cat owners are also showering their pets with gourmet dinners that sound as tasty as a restaurant's top menu items. Semi-moist cat food gave way to wet cat foods as 1988 sales for the latter totaled $1.2 billion up from 1987's $1.16 billion. Cat snacks sales leaped from 1987's $26 million to $33 million in 1988. New products:

• Star-Kist Foods added three flavors to its *Amore Gourmet Canned Cat Food*: Classic Beef & Liver; Gourmet Giblets; and Halibut & Cod.

• Kal Kan Foods, Inc. of Vernon, CA launched Catfish; Chunky Lamb; and Trout varieties of *Kal Kan Cat Food.*

• Ralston-Purina Company of St. Louis has added three new flavors to its *Purina Unique Cat Food* line: Ocean Fish with Shrimp in Aspic; Pacific Mackerel in Crab Jelly; and Sardines and Chicken in Aspic.

The trend of pet owners to indulge their pets with treats that appeal to humans is expected to continue. Ice cream-like treats for dogs will be launched in April 1989 from Associated Ice Cream. William Tyznik, an animal science professor at Ohio State University developed *Frosty Paws* for pet owners who enjoy feeding Fido ice cream. Most of the lactose has been removed from the whey to make it more digestible for dogs. Mr. Tyznik has been quoted by *Advertising Week* as saying the ice cream-like treat may be eaten by humans also.

Desserts

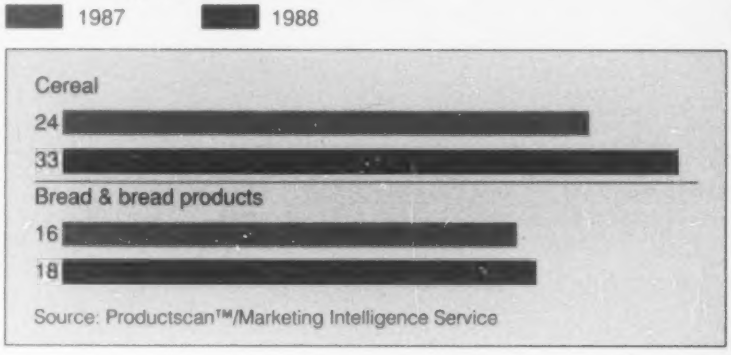
To better appreciate what types of new frozen dessert products are being introduced by food companies, it pays to take a look at what's happening within restaurants. As with other food categories we've discussed in this article, what consumers order on a restaurant menu is what they'll be hankering for near the frozen food case in the local supermarket.

Without a doubt, the sweet tooth is back. Restaurant dessert orders, which languished for much of the 1980s as diet-conscious consumers opted to forego end-of-meal treats, have experienced a resurgence of interest. Dessert orders increased by 3.2 percent in 1987 and 6.2 percent just during the first three quarters of 1988, according to the National Restaurant Association (NRA).

This follows a 1.3 percent decline in desserts ordered in restaurants between 1982 and 1987. "America is rediscovering its sweet tooth," said NRA President Jim L. Peterson. "Even weight-conscious consumers now feel that it's all right to splurge now and then."

1987, 1988 high fiber introductions

no. of introductions



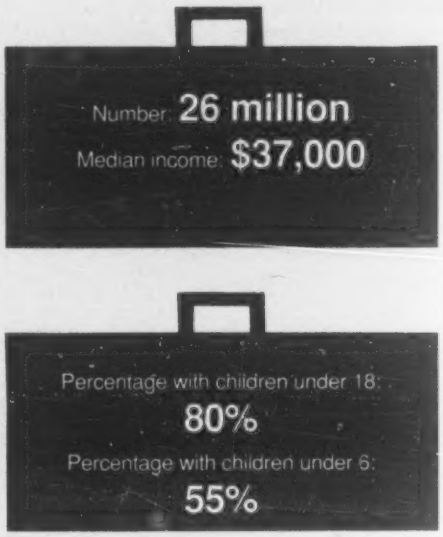
Source: Productscan™/Marketing Intelligence Service

Newly released NRA Consumer Research on Eating Share Trends (CREST) data reveals that ice cream is the perennial favorite of restaurant patrons. Ice cream orders gained 12 percent since 1982, representing 51 percent of all desserts orders in 1987. This increased interest in ice cream spilled over into the retail side with manufacturers reporting sales of more than $9.4 billion in 1987 according to FIND/SVP with frozen yogurt, ice milk and non-dairy frozen desserts showing the most dramatic growth. Ice cream sales are projected to top $11.5 billion in 1997, according to Business Trend Analysts.

Although superpremium ice cream is not the largest segment within the ice cream category, it is an area that has witnessed rapid growth in per capita consumption. However, industry sources conflict in their accounts of premium ice cream's current vitality on the market. FIND/SVP reports premium ice-cream sales slumped 19 percent in 1986 and another 13 percent in 1987. On an optimistic

The market for children's entrees will remain fairly steady over the next few decades.

Number of dual-income couples, 1988



Source: American Demographics

note, Frost & Sullivan, a New York City-based research firm predicts that superpremium ice cream will show 53 percent growth in sales from last year's $209 million to $320 million in 1992. The category shows a much more rapid rate of growth (more than three to one) over the larger "indulgent desserts" categories, such as frozen novelties and frozen bakery desserts. FIND/SVP estimates superpremium production doubled between 1980 and 1985.

While there is no strict definition of superpremium ice cream, manufacturers use the term to describe ice cream that contains: "natural" or high quality ingredients; 15-20 percent air in the product, compared to up to 50 percent in regular ice cream; and 15-20 percent butterfat, compared to as little as ten percent in regular ice cream.

The proliferation of new superpremium introductions has created intense competition for limited freezer space. In addition to traditional ice cream companies, candy companies have joined in the fray by selling licenses to produce ice cream containing chunks of popular sweets. Some notable introductions in 1988:

- DCA Food Industries, Inc. of New York sublicensed with Tootsie Roll Industries, Inc. to create *An American Tradition Tootsie Roll Ice Cream*. Varieties include: Tootsie Roll Ripple, Tootsie Roll Chunks, and Tootsie Roll Crunch with Almonds.
- Dove International, Division of Mars, Inc. of Burr Ridge, IL released *3 Musketeers Ice Cream Bars* that feature the taste of the popular candy bar in a chocolate-coated vanilla ice cream bar.
- Borden, Inc. of Houston updated Cracker Jack Candied Popcorn with its introduction of *Cracker Jack Ice Cream Bars*.
- Oberweis Dairy, Inc. of Aurora, IL has been licensed by several confectionery companies to make: *Milk Duds Candy, Slo Poke Carmel Candy, Whoppers Malted Milk Candy and Zagnut Candy Bar* ice cream.

Among the new players in the ice cream freezer case is Betty Crocker who took a break from baking to turn out *Brownie Sundae Ice Cream and Brownie Sandwiches*. The product is distributed by Vroman Foods, Inc. of Toldeo, OH, a subsidiary of General Mills, Inc.

Part of the mystique of superpremium ice creams are the exotic names that describe the flavors. Sometimes the names reflect a European ambience that manufacturers want to impart to the product to give it an upscale appeal while other names are simply exciting. The Cone Collection, Division of Taste Buds, Inc. of Green Farms, CT combined both approaches by introducing *Premium Cone Collection Ice Cream Cones*. Flavors include: Chocolate Obsession; Raspberry Romance; Forbidden Apple Cinnamon; Amaretto Mi Amore; Cappuccino; and Mocha Madness. Other examples:

- McConnell's Fine Ice Creams of Santa Barbara, CA offered: Amaretto Almond; Cappuccino, and Vermont Blueberry.
- Ben & Jerry's Homemade Ice Cream of

Waterbury, VT released more flavors: Butter Pecan; Chocolate; Heath Bar Crunch; Strawberry; Vanilla Chocolate Chunk; White Russian; and Chunky Monkey.

• Dickie Dee Ice Cream Ltd., subsidiary of Ault Dairies of London, Ontario introduced *Richard D's Vanilla Ice Cream Bars.* The line features 14 percent butterfat, imported pure chocolate covering and "a whisper of maple syrup" in its Chipwich Double Dutch and Chocolate Almond Cookies.

• Leichtman Ice Cream of Hazelton, PA tempts consumers with *Sinfully Yours Ice Cream.* Six varieties include: Calvin's Choice; Devil's Island Chocolate; Georgia Peach; Hazelnut Fudge; Heavenly Vanilla; and Viennese Crunch.

• Haagen-Dazs Co., Inc. of Teaneck, NJ introduced a vanilla ice cream bar dipped in Belgian milk chocolate and almonds.

• Dreyer's Grand Ice Cream Co., for example, introduced *Dreyer's Grand Light* ice cream in seven varieties including gourmet flavors such as Chocolate Fudge Mousse, New York Blueberry Cheesecake and Tempting Toffee Crunch. Purity Dairies rolled-out *Purity Gourmet Lite* ice cream in six flavors including Amaretto Almondine and Lemon Chiffon Pie. H.P. Hood introduced *Hood Light* Alaskan White Chocolate Avalanche and Triple Nut Cluster Sundae ice creams, plus two varieties of light ice-cream sandwiches.

Although approximately 90 percent of the households surveyed purchase ice cream, according to FIND/SVP, the popularity of ice cream alternatives continue to rise. Today's health and fitness trends have pumped adrenaline into the sales of frozen yogurt and fruit ices. Although the category is booming, the growth of ice milk and other frozen confections is on a much smaller scale than ice cream. According to the International Ice Cream Association's latest figures, ice cream production in 1987 was approximately 931 million gallons, compared to 923 million gallons in 1986. Ice milk production is approximately one-third that amount with 330 million gallons produced in 1987, up from 314 gallons the prior year. Much of the activity in the category is simply manufacturers increasing their advertising regarding ice milk products' lower fat content compared to ice cream. Some new products:

• H. J. Heinz's Weight Watchers International of Manhasset, NY unveiled a new ice milk line, *Weight Watchers Grand Collection Ice Milk* in: Cappuccino; Chocolate Fudge; Fudge Marble; Peaches 'n Creme; Strawberries 'n Creme; Swiss Vanilla; and Chocolate, Neapolitan and Vanilla. They are said to be made of all natural ingredients and contain 100 calories per serving.

• DCA Food Industries has been licensed by Cumberland Packing Corp. of St. Louis to launch *Sweet 'N Low Dietary Bars.* Consumers are most familiar with the company's line of artificial sweetener packaged in little pink packets. The artificially flavored vanilla bars are covered with a premium chocolate flavored coating that is "very low in sodium." Each bar has 120 calories.

• Kraft Inc.'s Breyers Ice Cream of Lansing, MI also unveiled an ice milk line. *Breyers Light Ice Milk* has one third less butterfat than ice cream. Flavors include: Chocolate Fudge Swirl; Chocolate Malted; Fudge Toffee Parfait; Natural Strawberry; Natural Vanilla; and Praline Almond Crunch.

• Imagine Foods, Inc. of Palo Alto, CA debuted *Rice Dream Non-Dairy Dessert.* The company said it uses a special process to change the starch in brown rice into natural sugars which are mixed with ingredients like carob chips to make the products. The frozen desserts are said to be cholesterol-free, low-fat, low-calorie, low-sodium and Kosher. Flavors include: Mint Carob Chip and Vanilla Swiss Almond.

• Borden premiered *Borden Light Premium Ice Milk* which has 33 percent less fat than ice cream. Flavors include: Chocolate

Children's food market
(in millions)

Chip; Cookies 'N Cream; Honey Roasted Maple Walnut; Mocha Almond Fudge Swirl; Praline Pecans 'N Cream; Raspberry Swirl; Strawberries 'N Cream; and Vanilla.

• French American Ice Cream Co., Inc. of Walnut Creek, CA offered *Cafe Glace Light Deluxe Ice Milk*. It has less than 100 calories per serving, is 95 percent fat-free, and uses pure fruit juice as a sweetener.

• Reynolds Metals Co.'s Eskimo-Pie Corp. of Richmond, VA presented its *Sugar-Free Eskimo Pie* which is aspartame-sweetened. Industry analysts commented that the growth of aspartame frozen novelties has been much slower than the first time beverages were launched with the sweetener.

• Barber's Ice Cream Co. scooped its *Lite Premium Ice Milk* in seven flavors; Knudsen *Nice n' Light 97% Fat Free Ice Milk* in three flavors; Pierre's French Ice Cream Co. *Lite Gourmet Ice Milk* in six flavors, 95 percent fat free and with one-third fewer calories but with "three times more calcium than regular ice cream or ice milk."

• Brigham's Inc. introduced *Light Ice Milk* in flavors including "assorted chocolates."

Health and fitness-conscious consumers who want still fewer calories and fat are attracted to frozen fruit bars and other fruit-based frozen products. However, this remains a very small segment of the total market, according to the International Ice Cream Association. Some of the latest market entries:

• Castle & Cooke of Hawaii launched *Dole Fresh Lites Fruit & Juice Bars* that are available in raspberry and pineapple-orange flavors. Sweetened with Nutrasweet, the bars have 25 calories each. *Dole Fruit 'N Yogurt Bars* are made with 100 percent "natural" ingredients. *Dole Chocolate Fruit 'N Cream* come in two varieties: banana with a milk chocolate coating and strawberry with a dark chocolate coating. Both have less than 180 calories.

• General Foods of White Plains, NY offered its *Crystal Light Cool 'N Creamy Bars* in orange/vanilla.

• Hendrie's, Inc. of Milton, MA, a division of Hendrie's Frozen Foods, Inc. introduced the *Hendrie's Citrus 'N Berry Stix* and *Fudge Stix*. They are sugar-free, sweetened with Nutrasweet and contain Vitamin C. The fruit Stix have 16 calories while the fudge Stix have 30 calories per serving.

Frozen yogurt began as a fad in the mid-seventies and came to an abrupt end in 1980. However, the market has recovered to the point that two chains of franchised frozen yogurt stores sold stock to the public for the first time in 1985. Although the category is growing, it is less than ten percent the size of the ice cream market.

Find/SVP estimates '88 supermarket sales of frozen yogurt to range between $35 to $50 million, or five percent of total frozen-yogurt sales (most is sold by specialty fast-food chains). SAMI/Burke reported '87 sales of frozen yogurt at $26.4 million, up 185 percent from a year earlier.

The International Ice Cream Association's most recent figures combine yogurt, pudding pops and other frozen dietary products into the same category. This category in 1987 showed total production levels of 38 million gallons compared to 35 million in 1986. The Dannon Company of Glendale, CA was a pioneer in the regular yogurt cate-

Pet food sales
(in millions of dollars)

	1986	1987	1988
Dog Food			
Wet	828	851	890
Dry	1,750	1,740	1,800
Semi-moist	200	182	165
Snacks	340	372	402
Cat food			
Wet	1,120	1,160	1,210
Dry	748	753	800
Semi-moist	245	223	214
Snacks	22	26	34

Source: SAMI/A Service of Arbitron

Sheba and Amoré are two of the latest offerings in gourmet pet foods. Other new releases include Happy Cat Crunchy & Meaty, Gravey Train Beef Flavor, Gaines Lite Dog Food, and Mint Flavored Milk Bone Biscuits.

gory and is now pushing the frontiers of what it claims is its 30 percent share of the market into the freezer case.

• *Dannon Soft Frozen Yogurt* debuted with no artificial ingredients, starches or preservatives. The product has half the calories and twice the calcium of most ice creams. Flavors include: Blueberry; Peach; Cappuccino; Cheesecake; Chocolate; Lemon Meringue; Peach; Pina Colada; Praline Pecan; Raspberry; Strawberry; Strawberry-Banana; and Vanilla. Dannon also introduced *Frozen Yogurt-On-A-Stick* bars in five fruit flavors containing real fruit and only 50 calories per 1.75-oz. bar. It also rolled-out *Soft Frozen Yogurt* mix in 12 flavors with no gums, starches, colors or "artificial anything" for soft-serve machines. "This product contains half the calories and twice the calcium of most ice creams plus it's low in fat and cholesterol," said Georges Casala, president & CEO of Dannon. Soft Frozen Yogurt contains 100 calories per 4-oz. serving (except for chocolate, which contains 120).

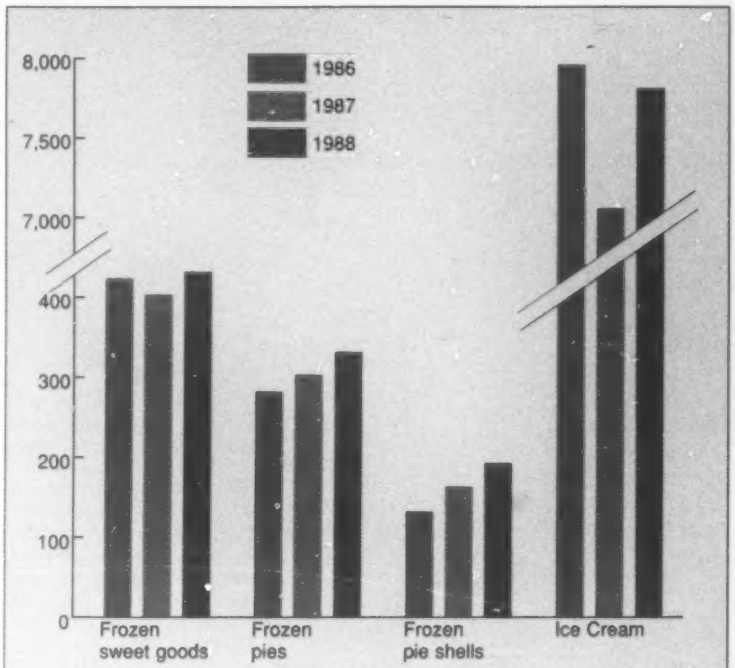
• Broughton Foods Co., Marigold Foods, Blue Bell Creameries, French American Ice Cream Co., Tim Torres Enterprises and Elan Foods also rolled-out frozen yogurts in several flavors while Alta-Dena Certified Dairies introduced frozen yogurt mixes for fast-food operators.

• Elam Mills of Hollywood, FL *Super-Premium Frozen Yogurt* compared its taste with premium ice cream but added its yogurt has "half the calories and 80 percent less fat" than ice cream.

• General Mills *Yoplait Soft Frozen Yogurt* is available in: Chocolate Chip; Coffee; Peach; Strawberry & Banana Swirl; Strawberry; Raspberry; Cherry; Mixed Berry; Banana; Vanilla; Blueberry; and Chocolate.

According to A.C. Nielsen, while the total yogurt category grew 13 percent 1986-88 the light segment boomed 89 percent and now accounts for nearly one-third of all yogurts sold. Light yogurt introductions rocketed from eight in '87 to 33 in '88 and will continue at a fast pace in '89. One reason: FDA's June '88 clearance of NutraSweet for sweetening yogurt and "yogurt-type" products. (According to FDA standards of identity, a "yogurt-type product" does not contain a carbohydrate sweetener.) Kroger Co. immediately launched *Kroger Lite*—a non-fat real-dairy yogurt-type product containing fruit and sweetened with NutraSweet—in six fruit flavors. According to Kroger, the product is low in cholesterol and contains only 120 calories per 8-oz. cup, "half the calories of regular yogurt." General Mills followed in January of this year with *Yoplait Light*, "the first nationally-branded nonfat yogurt sweetened with NutraSweet." Available in five fruit flavors, Yoplait Light contains only 90 calories per 8-oz. cup—"about 150 fewer calories than the leading lowfat yogurts...without sacrificing taste and texture," said Product Manager Randall Laco.

Frozen dessert sales, 1986-1988
(in millions of dollars)



Source: SAMI/A Service of Arbitron; International Ice Cream Association.

• Meanwhile, Weight Watchers introduced four varieties of *a la Francais Nonfat Yogurts*.

• Johanna Farms rolled-out five flavors of *La Yogurt 25* nonfat yogurts.

• Springfield Creamery unveiled *Nancy's Lowfat Yogurt* in eight flavors plus a nonfat variety.

• Alta-Dena Dairy introduced four flavors of *Fruit on Bottom Nonfat Yogurt* and three flavors of *Espirit Lite* nonfat yogurt.

• The first known fiber-fortified lowfat yogurts debuted: *Darigold Lowfat Yogurt* in two flavors, from Darigold, Inc.

As frozen yogurt continues to grow, a few products are presenting themselves as alternatives to yogurt. Products such as kefir, tofu, fromagg frais and leben are new arrivals. Mehadrin Dairy Corporation presented its leben as a "cultured dairy product that dates back to the ancient Middle East." Flavors include: Chocolate; Plain; Strawberry;

Several popular brands were the object of product extensions into the frozen dessert category, including 3 Musketeers, Sweet 'N Low and Betty Crocker brownies. Duncan Hines Tiara Dessert mix promised to be a premium treat with fewer calories while Pepperidge Farm paraded regional favorites from its American Collection.

and Vanilla.

Americans are also warming up to premium desserts found outside of the freezer. Sales of premium baked goods in 1987 were $2.94 billion and are expected to reach $4.25 billion by 1991, according to FIND/SVP. The category is divided into six areas: premium and superpremium packaged cookies, packaged soft cookies, cookie store cookies, frozen and shelf-stable cakes and pies, bake-at-home mixes and doughs, and goods prepared in in-store bakeries. FIND/SVP market studies report that some products are "premium" only because they are marketed that way. The image of quality (actual or perceived) is what attracts consumers to these taste-bud treats. New desserts include:

- Pepperidge Farm, Inc. of Norwalk, CT introduced frozen single-serve *Pepperidge Farm American Collection Desserts*. Currently the line consists of eight indulgent desserts that can either be microwaved, conventionally heated or thawed and served.
- Gourmet International Foods, Inc. of Chicago debuted *Mousse Éclat*. It is made of "all-natural" ingredients and is the only chocolate mousse served from a pressurized can. Flavors include: Chocolate and White Chocolate in both regular and low-calorie versions. Developing an aerosol can filler that could handle food with eggs as an ingredient took more than a year.
- Ativo Gourmet Confections of Emeryville, CA introduced *Ativo, the Cookie*. Half of the gourmet shortbread cookie made with chocolate chips and pecans is dipped in chocolate.

The future

Successful introduction of new food products (or any product, for that matter) involves knowing what the consumer wants before even he or she knows. The importance of convenience, nutrition and quality will continue, but changing specifics within these trends need to be addressed.

Current trends such as eating out and grazing will continue, according to a survey of Home Economists in Business conducted by Dr. John L. Stanton and Dr. Claire Boasi at the Food, Nutrition and Health Research Institute at Saint Joseph's University, Philadelphia. Ninety-two percent of those surveyed thought grazing—eating several small meals a day—would remain the same or increase, and 65 percent said we would be eating out more than we do now. Automobiles with built-in microwave ovens are a real possibility for the future. This would make eating-on-the-run even easier.

The American population is aging which will impact future food needs. According to a report on mature adults by Frost & Sullivan, Inc., the elderly spend more per capita than any other age group on food. And they are more health conscious and more concerned about nutritional factors such as salt, fat, cholesterol, fiber, calcium, caffeine, artificial additives, vitamins and minerals. But the elderly are not the only ones with increasing nutrition concerns.

"Food is more and more linked up in consumers' minds with how they feel," said Campbell Soup's McGovern at the Frozen Food Convention. "Today it is fiber, cholesterol, additives, pesticides, calories, and too much salt. Tomorrow it will be other things as medical discoveries uncover how our bodies work."

In the area of quality, consumers are becoming more discriminating. Instead of just Oriental foods, specific cuisines such as Thai will continue to become more prevalent. And we'll see more regional American products. The Saint Joseph's University survey noted new interest in southern foods.

Satisfying consumers' desire for convenience will center around microwaveable foods. A better understanding of what's happening at the molecular level when foods are microwaved is needed so product quality in this area can be improved even further. Also, improvements in the distribution system are needed for frozen and refrigerated foods. McGovern stressed the importance of simplifying product lines and concentrating on technological improvements in the total frozen food system which would then allow food companies to give more value, quality and advertising support. As food introductions level off, perhaps this is the direction the entire food industry will go.

VALVES

THE WORKHORSE OF THE INDUSTRY

Often overlooked in importance, valves are a vital, integral part of the processing cycle. And specialty valves are predicted to be a future area of investment for the food industry.

Valves in a food or beverage plant are like paperclips in the office – they're everywhere! But specifying specific valves for individual uses involves a lot more than choosing the right paperclip. It involves not only a knowledge of the process in which the valve will be used, but the types of valves available.

What are the criteria?

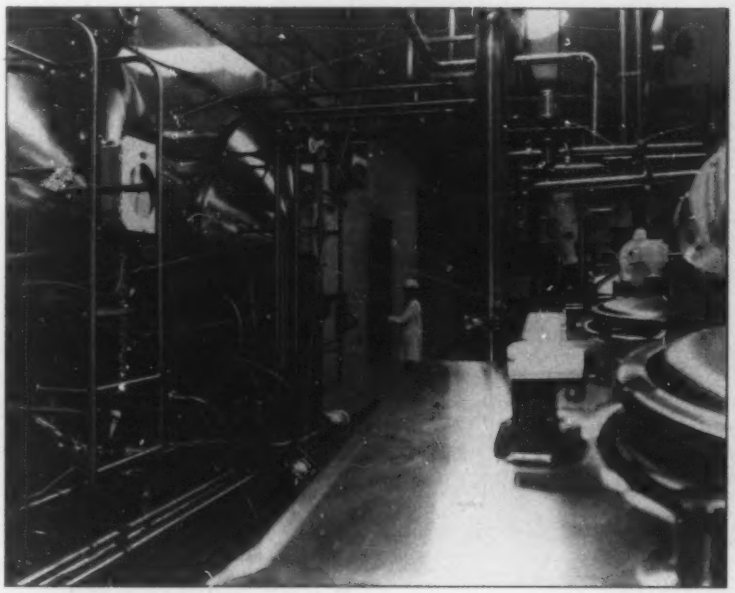
Specific valves handle specific requirements (see sidebar). In making valve selections, however, there are certain criteria to be considered:

- What is the substance being handled and what is the required flow rate?
- Is the fluid corrosive or erosive?
- What is the condition under which the valve will be asked to operate?
- What temperature must the valve withstand, and what is the maximum working pressure?
- Are actuators necessary?
- What are the maintenance requirements?

"The product going through the valve is going to be a prime criteria," says Tab Orbaker, manager, process engineering at Alfa-Laval, Kenosha, WI. "There are a lot of different products and fluids to be considered, and you must know how they will react with certain materials. The product will decide the body and seat materials."

Body, seat materials

The food industry uses primarily 316, with some 316L, and even 304 stainless steel bodies for its valves because they provide cleanability and level of corrosion resistance vital to efficient operation and product integrity. "Valves have to be able to withstand higher temperatures and the cleaning fluids, which if improperly used can be tremendously corrosive, which is why 316 stainless steel is used instead of 304," says Jim Beckman, marketing manager for fittings, valves and pumps at Cherry-Burrell, Cedar Rapids, IA.



Source: Cherry-Burrell

Just as important as the body material is the seat material. Today there are more seat materials available than ever before. Plastic and fluorocarbon are finding increasing use because they are tasteless and odorless and do not affect the product being processed. Plastics are being used primarily for seats, gaskets and "O" rings. But even though they are growing in use, Tancred Lopresti of Robert-James Sales, Inc., distributors of sanitary fittings, tubing and valves, sees plastic piece uses limited by "temperature

LINDA K. FREEMAN
Contributing Editor

restraints and mechanical strengths."

In the food industry, teflon is also growing in use as a seat material. Originally seats were metal to metal, then along came silicone, rubber, etc. Now teflon offers the flexibility of use in high temperature valves. "Teflon," says Al Holton, marketing manager at Nellis-Jamesbury, Worcester, MA, "provides many advantages, such as almost universal chemical compatibility; and it is FDA approved." Nellis-Jamesbury's *Double-Seal* ball valves employ a "lip-seal" design to "build continuing sealing effectiveness into the structure of the seat itself," says Holton. The valves use a "corner seal" design employing teflon seals combined with a "radial squeeze" effect produced by the stem against the seal to give superior stem sealing characteristics, says the company.

Tri-Clover's *361 Series* of valves now uses a replacement teflon seat. "The change to a teflon seat came about because the mounted rubber seat previously used could deteriorate in high temperature or with corrosive fluids," says Al Harms, manager, project engineering for Tri-Clover, Kenosha, WI. With a teflon replacement seat, the old one can be cut off, and a new one snapped on. Replacement costs $20 rather than $150. "Teflon," says Harms, "is becoming more popular because it wears longer, resists corrosion and is easily replaced and cheaper to use."

Not all manufacturers, however, are sold on the use of teflon. Orbaker at Alfa-Laval thinks teflon is expensive to use and there is a cold-flow problem—the teflon doesn't spring back, he says, and if the teflon gets some dissimilarity, it may not resume its original seat. "Teflon is not forgiving," says Orbaker. "It can take a high temperature," he says, "and it has good stable chemical properties; but it has its drawbacks."

Elastomer seals

More common in use than teflon are four elastomers well-known for their performance capabilities in food and beverage processing applications.

- EPDM (ethylene, propylene) offers good resistance to heat, saturated steam, abrasion and aging, as well as resistance to hydraulic fluids, diluted acids and bases.
- FPM (Viton) is a fluorinated synthetic rubber for applications specific to high temperature, in particular in air and oil. Viton offers excellent chemical resistance, and good resistance to microorganisms, certain solvents, ozone. Another plus: good mechanical properties even at low temperature.
- Silicone (food quality silicone VMQ) is an elastomer with outstanding resistance to high and low temperature. There is a highly adapted formulation available for food applications.
- Neoprene (food quality neoprene C.R.) is one of the oldest synthetic rubbers, the formula of which has been adapted for food applications. It offers excellent mechanical and

A primer: the common types of valves

Multi-Turn Valves

Gate Valve—a general service valve used mostly for on/off, non-throttling service. A flat face, vertical disc or gate slides down through the valve to close it and block the flow.

Globe Valve—used for on/off service and clean-service throttling applications. It is closed by a plug with a flat or convex bottom which is lowered onto a matching horizontal seat located in the valve center. Raising the plug allows flow through.

Pinch Valve—used widely with slurries or liquids with large amounts of suspended solids. Seals with a flexible element, such as a rubber tube, that can be pinched to shut off flow.

Diaphragm Valve—closes by means of a flexible diaphragm attached to a compressor. When the compressor is lowered by the valve stem onto a weir, the diaphragm seals and cuts off flow. Used for corrosive, erosive and dirty services and is easily maintained.

Needle Valve—a volume control valve that restricts flow in small lines. Fluids passing through the valve turn 90 degrees and pass an orifice that is the seat for a rod with a cone-shaped tip. The size of the orifice is changed by positioning the cone in relation to the seat.

Quarter Turn Valves

Plug Valve—used mostly for on/off service and some throttling services. Flow is controlled by means of a cylindrical or tapered plug with a hole in the center that lines up with the flow path of the valve to permit flow. A quarter turn in either direction blocks the flow path.

Ball Valve—used for on/off and some throttling services. Similar in concept to a plug valve, but uses a rotating ball with a hole through it that allows straight-through flow in the open position and shuts off flow when the ball is rotated 90 degrees to block the flow passage.

Butterfly Valve—used for both on/off and throttling services and requires a minimum of space. Controls flow by using a circular disc or vane with its pivot axis at right angles to the direction of flow in the pipe.

dynamic properties similar to those of natural rubber. Neoprene gives a high level of resistance to all foods, to certain solvents, to dilute bases and acids, to inorganic salt solutions and to ozone.

The future is automation

"Previously, valve systems were more hand operated," says Cherry-Burrell's Jim Beckman. "Now more are automatically done." Generally, says Beckman, automated systems are more apt to be designed for CIP. The hand operated valves are more apt to be COP, cleaned-out-of-place.

The sophistication of automation, says Beckman, offers three distinct advantages:

1.) Consistency in product quality.
2.) Major labor savings.
3.) Better scheduling for the end user.

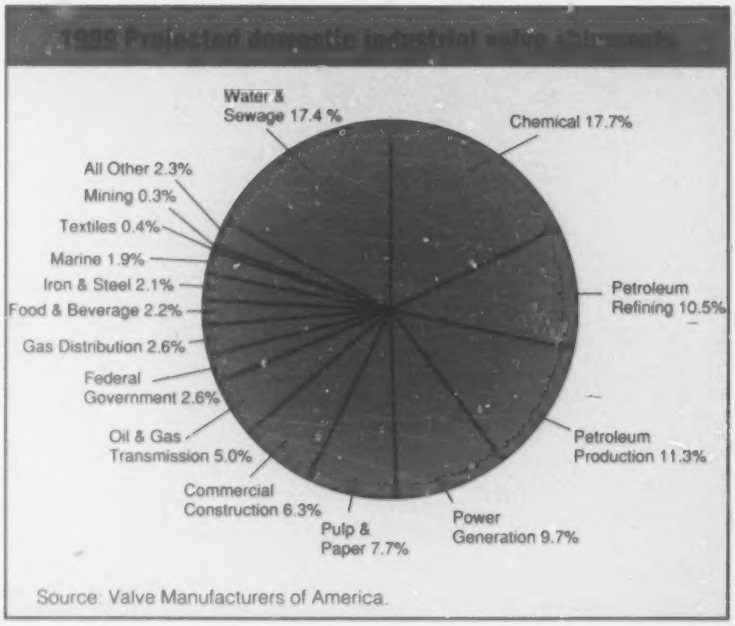
A fourth advantage is related to the bottom line – "Automation gives you the opportunity to save money," says Wilkin Chin, senior marketing specialist at The Foxboro Company, Foxboro, MA. "If you are using expensive resources, such as in the food industry, and using them in large quantity, then the percentage you can save by using an automated system becomes significant," he says.

For example, says Chin, "If your control valve or control system offers 2 percent accuracy, and you can increase that to within 1 percent accuracy by using an automated system, you would decrease the cost of your goods by 50 percent."

"As an industry matures, you do a lot of inexpensive things first. It has gotten to the point now where fractions of percentages are going to increase your profitability," says Chin.

Product safety

Also affecting the bottom line of a food processor is the safety of the product he pro-



Self-Actuated Valves

Check Valve—designed to prevent backflow. Back flow forces the valve to close, flow in desired direction opens valve.

Relief Valve—provides protection from overloading steam or gas lines. Opens when safe pressures are exceeded, closes when pressure drops to preset level.

Control Valves

Control Valve—designed to offer accurate proportioning control of flow. Automatically varies the rate of flow based on signals it receives from sensing devices in a continuous process. Some valves are designed specifically as control valves; most types, however, can be used as control valves by the addition of power actuators, positioners and other accessories.

Specialty Valves

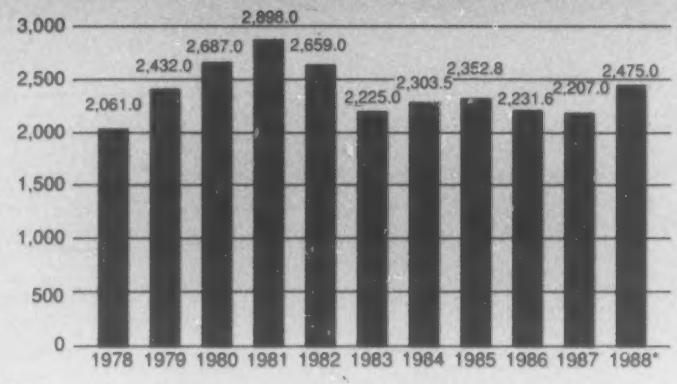
Custom-designed valves and accessories to meet the needs of processors with specific applications have been developed through the years.

Actuators

Manual Actuator—uses levers, gears or wheels to help facilitate movement, while an automatic actuator is an external power source that provides the torque to operate a valve remotely or automatically. Power actuators are a necessity on valves in pipelines in remote areas and are used on valves that are frequently turned on, turned off or throttled.

Hydraulic and Pneumatic Actuators—simple devices used on quarter-turn valves and other rotary devices. Sufficient air or fluid pressure provides the required thrust or torque and acts on a piston that is linked to the valve stem to open or close the valve.

Electric Actuators—use motor drives to provide the thrust or torque to operate a valve. These are used most frequently on multi-turn valves and on quarter-turn valves where pressurized air or hydraulic systems are not available.



*Annualized data based on nine months of 1988
Source: Valve Manufacturers Association of America.

duces. Part of that quality control involves the proper valving so that CIP and processing fluids do not mix. One answer is double-seat valve systems.

Cherry-Burrell's *Sentinel* double block and vent valves, for example, can be used with automatic valve manifolds. The Sentinel valve permits CIP cleaning of each line separately, through the valving matrix, even while running product in a parallel line. CIP fluids cannot come in contact with process fluids, eliminating the nightmare of cross-product contamination. Once two fluids mix that should not come in contact with each other, the expense of destroying the entire batch, or the day's output, is an expense no one wants to bear.

Tuchenhagen North America's *Varivent* line also includes a double seat valve. George Medal, process engineer at the Milwaukee, WI company, says the double seat valve, built to meet 3-A criteria, offers the processor a high level of protection. "Any valve is going to leak sooner or later," says Medal. In a double-seat valve, the upper and lower valve housings are each fitted with a valve seat. The chamber between the valve disks is connected to the open environment by an isolation outlet integrated into the lower valve spindle. Should seal damage occur, leaking fluid flows safely into the open. Faults can easily be detected and rectified, and leakage from one body cannot contaminate liquid in the other body.

Still lots of manuals

There is still a long way to go, however, before valving systems are predominantly automated in the U.S. "The American market is behind the European market," says William Stern, sales manager at Defontaine, Inc., Wales, WI. "They are much more highly automated while the U.S. is more labor intensive." This, says Stern, can be attributed to the number of older plants currently in operation. However, as existing plants become obsolete and are closed down or retrofitted, the new plants will be increasingly automated. "The number of old plants (in the U.S.) is overwhelming," says Stern, who says 90 percent of the valves he sells are manually operated.

Tanaco Products of Blaine, WA, has a spring-operated, three-way plug valve in use in critical areas in dairy processing lines. This is a hand-operated, in-line valve "without the usual leakage problems or labor intensive operation," and is 3-A approved, says Annelie Hoyer, president of Tanaco. In the dairy industry, valves must have 3-A approval and the plug valve is the valve of choice. Butterfly valves, probably the most common valve in processing applications, is not 3-A approved for dairy usage.

The Tanaco *In-line* valves use chemically resistant plastic plugs which can be thoroughly cleaned in place without removing them from the bodies, hence "cleaned in line."

The result: elimination of the labor costs of manual cleaning, possible contamination and damage to the equipment. The valve can be used with various operating pressures and different product viscosities. The valve bodies are made of 316 stainless steel, and all other parts of the valve and actuator are of stainless except the plastic plug which is chemically inert, resistant to 350°F, steam sterilizable, lightweight, nonabsorbent, nontoxic, tasteless and odorless and requires no lubrication.

Alfa-Laval's automatic constant-pressure modulating valve type "CPM" evolved as a way of controlling upstream pressure or downstream pressure in a process line, says Tab Orbaker, and operates without the use of any advanced control system. "You can set the regulator to a set pressure and leave it," says Orbaker. It is sanitary, can be cleaned in place and is designed for a plant not fully automated. The required product pressure is preset by means of the pressure reducing valve. The product pressure is indicated on the pressure gauge. The valve reacts immediately to any alterations of the product pressure and changes position so that the preset pressure is maintained. Says Orbaker, "Set it...and forget it."

Butterfly valves, as noted above, are per-

VALVES

According to figures from the Valve Manufacturers Association of America, total imports of industrial valves increased by 32.1 percent during the first six months of 1988. Valve bodies and parts constitute a major portion of the total import picture, accounting for 27 percent of the total in 1988.

Import share of U.S. industrial valve market

1984	15.7%
1985	18.8%
1986	22.7%
1987	24.5%
1988	29.7%

Source: Valve Manufacturers Association of America

haps the most common valve in use in the food industry and can be either manually or pneumatically operated. All valve manufacturers—Defontaine, Cherry-Burrell, Alfa-Laval, Robert-James, Tri-Clover, etc. provide butterflies to the industry. Although they will remain the workhorse of the industry, plug valves may be making a comeback.

"At first," says Tancred Lopresti of Robert-James, "in our part of the business there was a shift from plug valves to butterfly valves. Now I see a trend away from the manual butterfly toward the plug valves," he says.

Other trends

Another trend in the valve industry is overall optimism. From 1982 until about mid-1987, the valve industry experienced difficult times.

"The industry was flat," says Holton at Nellis-Jamesbury, "and there was little plant expansion. People were using bandaids and paperclips to hold things together."

Things have turned around since then, however, as manufacturers experienced better results in the latter part of '87, a stronger '88 and see reason for great optimism in 1989. It is the consensus that 1989 will be a strong year for plant construction and expansion, which means a strong year for equipment manufacturers. The Freedonia Group, Inc. of Cleveland, OH forecasts an "above-average 6.2 percent per year (growth) through 1991," backing up the industry-wide optimism.

Out of the five year stretch of hard times, a strong valve industry emerged. "The marginal producers didn't stay in business,"

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says Al Holton. Other manufacturers were merged or acquired, leaving an industry "lean and mean" and poised to respond to food processing needs.

The challenges

Although valves haven't evolved much over the past decade or two, there are still needs in the food processing area for valve manufacturers to fill.

One is a higher level of automation. Cherry-Burrell's Beckman sees "more automated systems coming online." Continuous processes are more apt to use an automatic system; the traditional batch process is less sophisticated, he says. But as the industry continues to move toward more continuous batch processing, the need for automation grows.

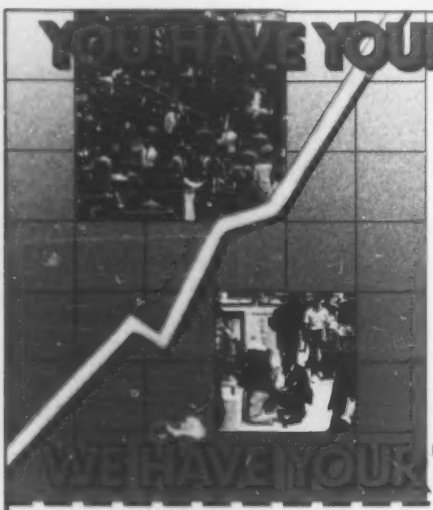
Processors are also looking for more valves to handle particulate and viscous products. As these products grow in popularity in the marketplace, there is a greater need to have a wider range of valves to handle production requirements.

Several manufacturers all cited the same challenge facing the industry...and that is in the area of butterfly valves. "Someone needs to develop a 3-A acceptable butterfly valve," says Alfa-Laval's Orbaker, "to handle very large particulates." To date, no one has been able to develop a butterfly valve for dairy plant applications that has the stamp of approval from 3-A.

"I think the next generation of sanitary valves will probably look quite different from anything we have today to meet the criteria and the governmental restraints imposed on the food industry," says Foxboro's Chin.

Specialty valves will be an area of investment for the food industry, says Chin, with valve manufacturers being asked to respond to specific requests to design valves to fill a particular need that is not currently being addressed by any general valve manufacturer. "The food industry is very creative for this type of work," he says.

Perhaps the next generation of valves will include that 3-A approved butterfly valve everyone wants. With the food industry in a position to invest in new equipment, and the valve manufacturers ready to respond to market needs, it's only a matter of time.



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